Lesson Plan Table of Contents

February 27, 2012

Welcome to Harris Broadcast

Platinum VAX

VHF Air Cooled Transmitters



6.4kW COFDM TV, 10kW DAB,
12kW ATSC, 16kW Analog

Presented by:

Harris Training Department

Platinum™ VAX Series

Air Cooled
VHF TV Transmitters

VAX 5000 DA

Model no. prefix

V = VHF (others U, L or F)

A = Air Cooled (L for liquid)

X = Transmitter

Peak visual power for analog

Average power for digital

Pre-filter power given in model number.

A LPU on top if dual drive in same rack.

Model no. suffix

AN = analog (ATV)

AT=ATSC

DV=DVB-T/H

T2=DVBT2

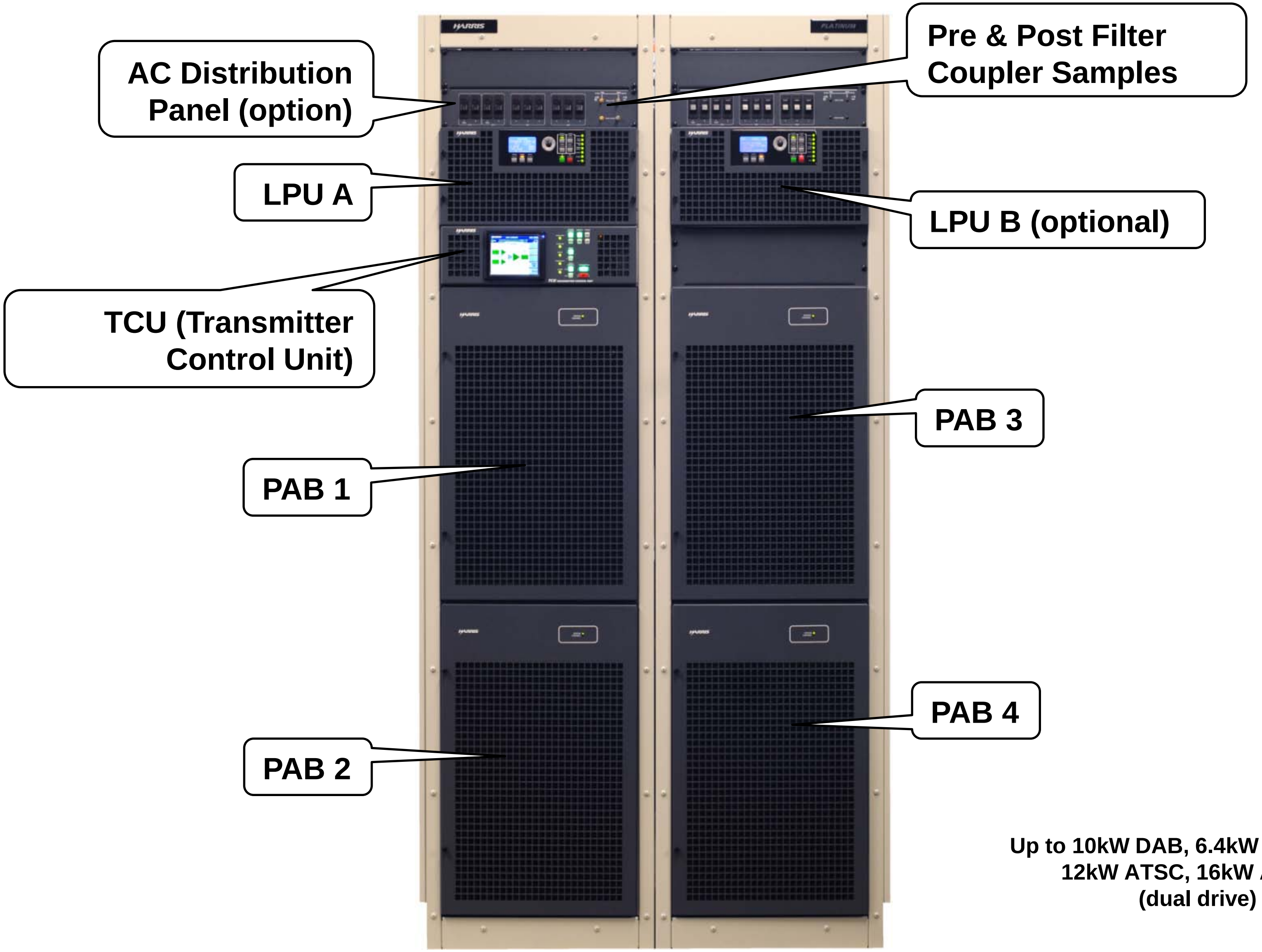
IS=ISDB-T

CT= CTTB

CM=CMMB

MH=Mobile Handheld
(used in ATSC, was MPH, need Synchrony)





Up to 10kW DAB, 6.4kW COFDM TV, 12kW ATSC, 16kW Analog (dual drive)

PLATINUM™ VAX SERIES

- VHF, Band III, air- cooled, multi-standard transmitter
- Broadband design, frequency agile across VHF Band III (168-242MHz)
- Hot pluggable PA modules
- Hot pluggable power supplies
- Incorporates Apex M2X multimedia exciter technology
- RoHS & CE Compliant
- Control from single LPU*, additional controller for dual drive options

* Low Power Unit (includes exciter, system control & one PA Module)



Front Air Plenum Option

- LDMOS transistor performance:
  - 50 Volt device architecture
  - Highest device power density available
  - Higher gain device, fewer driver stages
  - Virtually zero long-term I_{dq} drift, for simpler design with fewer parts
  - Improved reliability and stability
- Switch mode AC-DC power supplies
- Superior efficiency for lower power consumption & lower operating cost, smaller footprint
- Field serviceability to pallet level
- Compact, simple and rugged design

PLATINUM VAX PRODUCT FAMILY
(POWER LEVELS SHOWN ARE BEFORE FILTER)



Up to 150W DAB, 100W COFDM TV, 180W ATSC, 250W Analog



Up to 600W DAB, 400W COFDM TV, 750W ATSC, 1kW Analog



Up to 2.5kW DAB, 1.6kW COFDM TV, 3kW ATSC, 4kW Analog



Up to 5kW DAB, 3.2kW COFDM TV, 6kW ATSC, 8kW Analog (single drive shown, dual drive avail. in two racks)



Up to 7.5kW DAB, 4.8kW COFDM TV, 9kW ATSC, 12kW Analog (single or dual drive available)

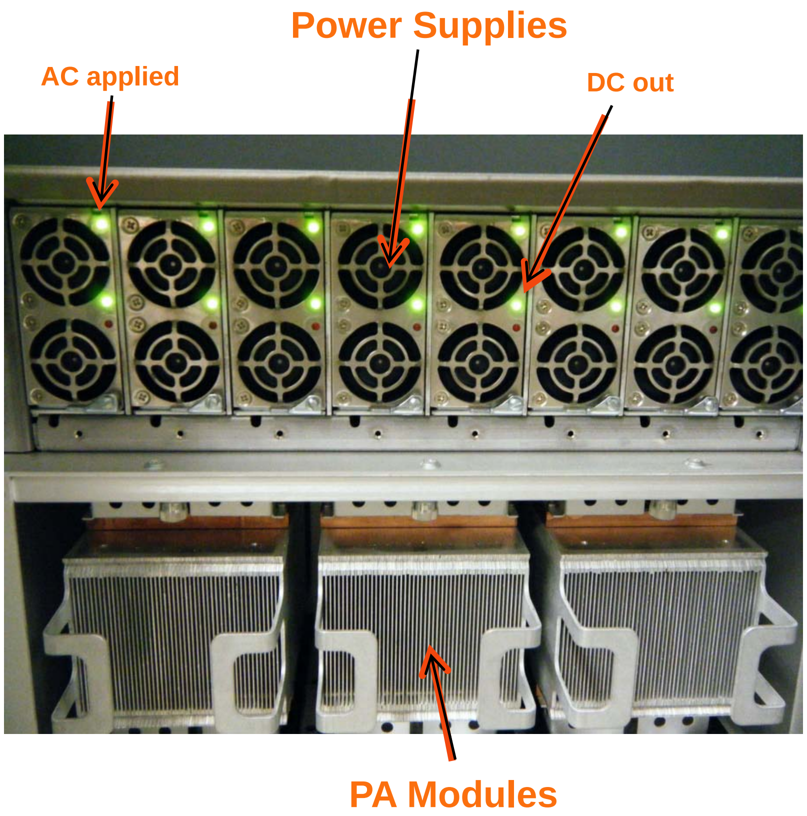


Up to 10kW DAB, 6.4kW COFDM TV, 12kW ATSC, 16kW Analog (single or dual drive available)

LPF is external on multiple cabinet transmitters.
Racks bolt together for shipment.

PLATINUM™ VAX POWER SUPPLY

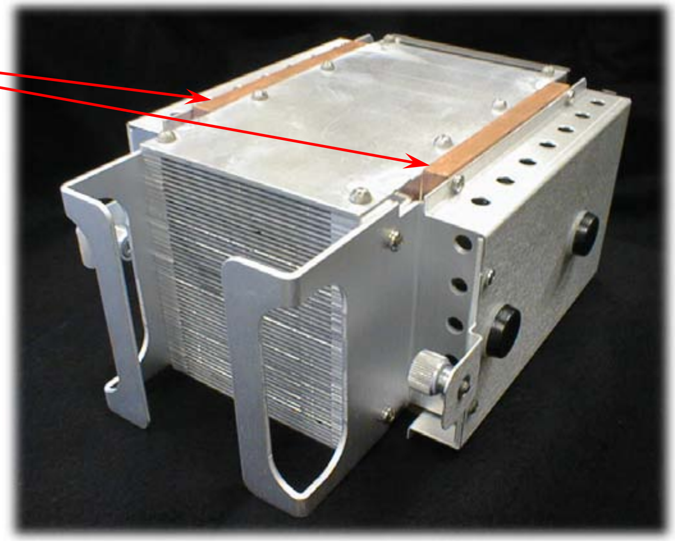
- Universal input 90 – 265 VAC 50/60Hz
  - Single Phase
- High-efficiency, auto ranging
- Good power factor (>0.98, nominal)
- Low AC line harmonics
- Mounted on slides, hot pluggable via transmitter front
- One power supply per PA module for high reliability
- Power supply efficiency ~ 90%
- PSs ship installed. Straight slot screwdriver to remove.



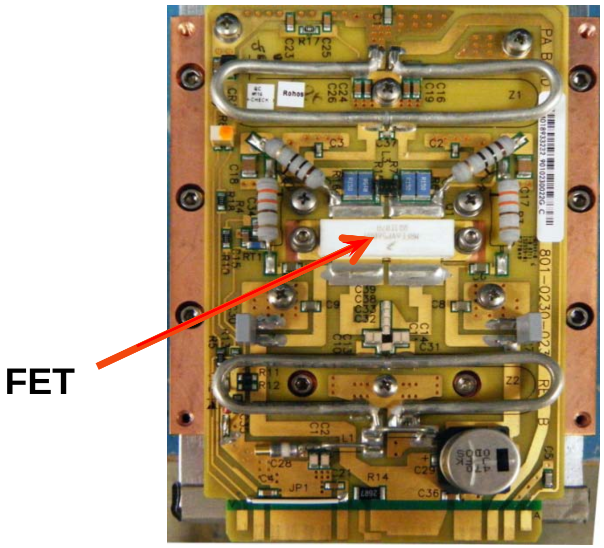
VAX modules not interchangeable with DMB, or Z modules.

PLATINUM™ VAX
RF PA MODULE – BAND III

- Two identical RF pallets per amplifier module



- 168-242 MHz frequency range
- Module Power rating: 200W COFDM
  300W DAB
  375W ATSC
  500W analog
- Module Gain 21-23dB.
- Lightweight, hot-pluggable and Interchangeable
- Two LDMOS devices per module (one per pallet)



- Weight: 4.5kg (9.9 lb)
- Size: 229mm x 178mm x 102mm
  (9”D x 7”W x 4”H)

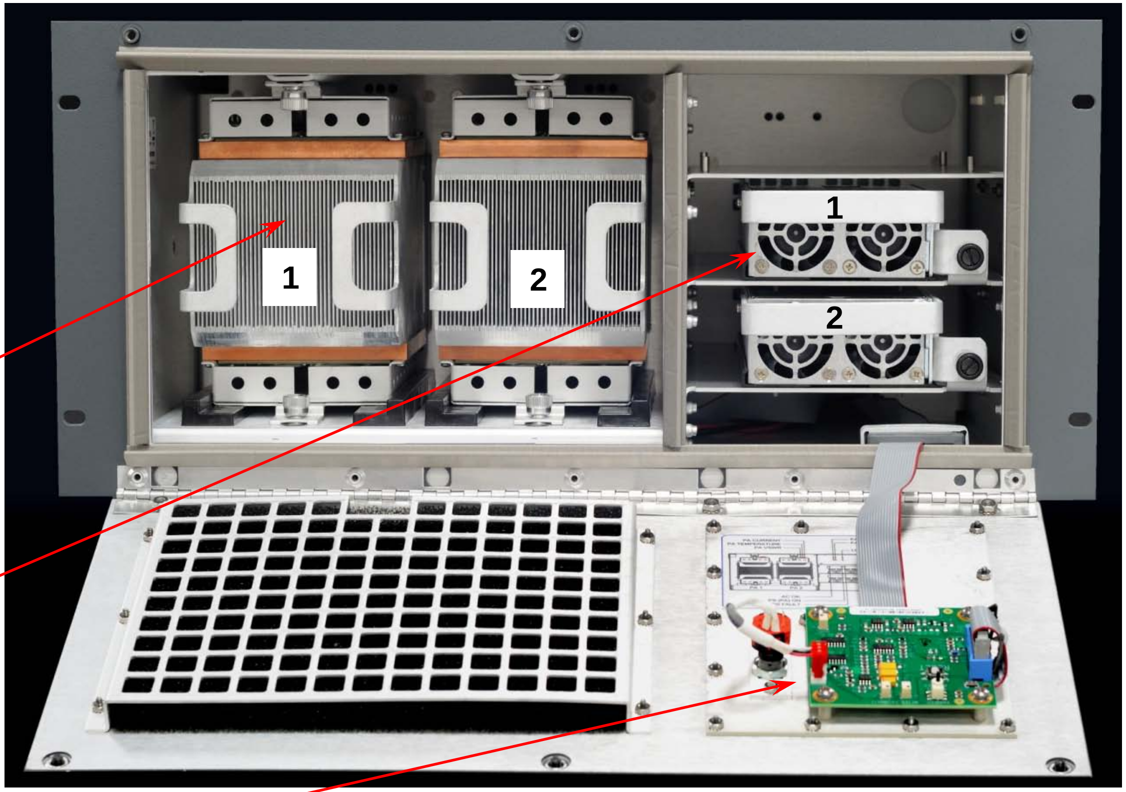
PLATINUM™ VAX – VHF PLATFORM

5 RU - 2 PA Chassis

- Pre-filter power levels up to:

	Cascaded PA's	Parallel PA's
COFDM	200 W	400 W
DAB	300 W	600 W
ATSC	375 W	750 W
Analog	500W	1 kW

- PA modules
  - Hot swappable
- Power Supply module
  - Hot swappable
  - 1:1 with PA module
- Control Interface to the transmitter system. Same as on 4/8 module PAB



- Can't change fans while on-air.
- PA module backplanes contain LEDs (VSWR, Temp, Current) and protection circuits.
- LEDs on backplane behind modules.

PLATINUM™ VAX – VHF PLATFORM
PA BLOCK

16 RU amplifier chassis:

- PAB includes 4, 6 or 8 PAs.
- 8 PA unit has split IPA
- PAB power levels:

	4 PAs	6 PAs	8 PAs
COFDM	800 W	1.25 kW	1.6 kW
DAB	1.25 kW	1.87 kW	2.5 kW
ATSC	1.5 kW	2.35 kW	3.0 kW
Analog	2.0 kW	3.0 kW	4.0 kW

- Modular power supplies. IPA supplied by 50V buss.
- Control interface to the transmitter system
- RF power amplifiers (PA modules)
- Hinged front door with washable filter

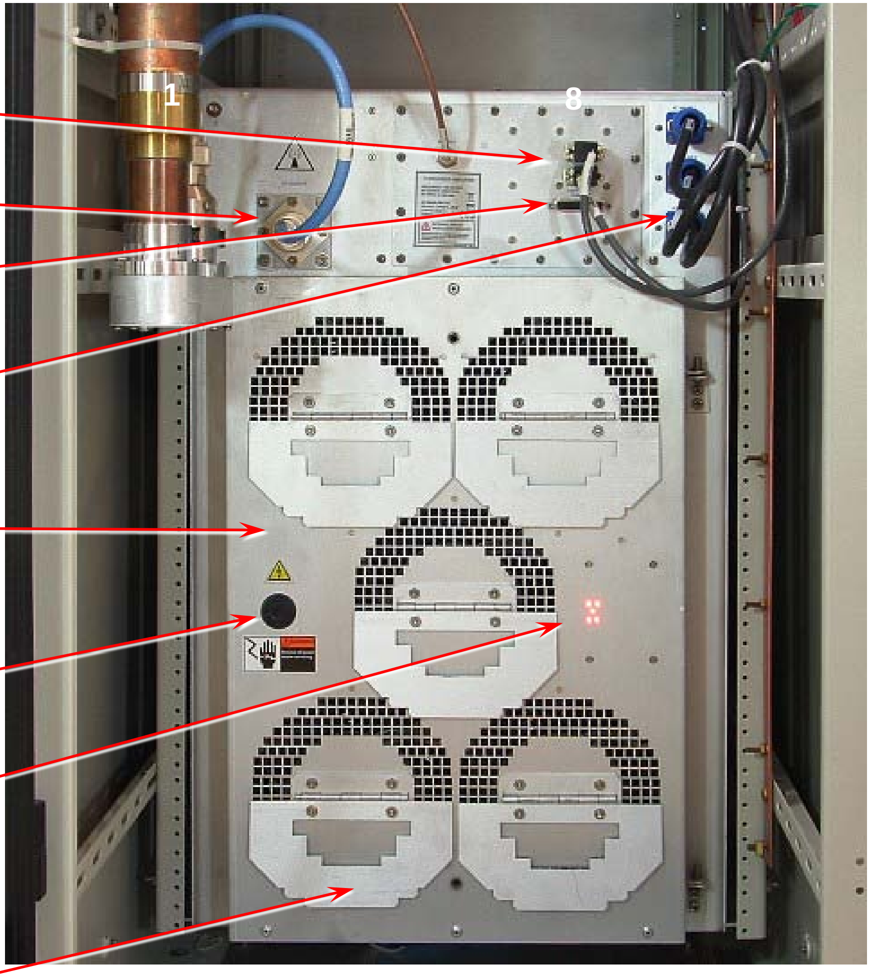


PA & PS # 1,3,5,7 & IPA removed for 4 PA version.

PA & PS # 3, 6 & IPA removed for 6 PA version.

PLATINUM™ VAX – VHF PLATFORM
PA BLOCK

- RS 485 and interlocks
- RF output 7/16 DIN
- User Remote connector
- AC inputs, Powercon connectors
- 5, single speed, 50V fans on back door. Change entire door to change fans fast
- Hex wrench key (5/16” or 8mm)
- 5 fan LEDs - up to 3 fans can fail without overheating
- Flappers – prevent fan stalls at startup



PLATINUM™ VAX – POWER LEVELS

Modules	Configuration	Cabinets	Modules		
			PA	IPA	PS
VAX-50DA, 50XX, 100AN, 60AT	(1) 5RU LPU	0 or 1	1		1
VAX-150DA, 100XX, 250AN, 180AT	(1) 5RU LPU	0 or 1	1		1
VAX-300DA, 200XX, 500AN, 375AT	(1) 5RU LPU	0 or 1	1		1
VAX-600DA, 400XX, 1000AN, 750AT	(1) 5RU LPU	0 or 1	2		2
VAX-300DA-A, 200XX-A, 500AN-A, 375AT-A	(1) 5RU LPU (1) 5RU PAB	0 or 1	1 2		1 2
VAX-600DA-A, 400XX-A, 1000AN-A, 750AT-A	(1) 5RU LPU (1) 5RU PAB	0 or 1	1 2		1 2
VAX-1250DA, 800XX, 2000AN, 1500AT	(1) 5RU LPU (1) 16RU PAB	0 or 1	1 4		1 4
VAX-1875DA, 1250XX, 3000AN, 2250AT	(1) 5RU LPU (1) 16RU PAB	0 or 1	1 6		1 6
VAX-2500DA, 1600XX, 4000AN, 3000AT	(1) 5RU LPU (1) 16RU PABs	0 or 1	1 8	1	1 8
VAX-5000DA, 3200XX, 8000AN, 6000AT	(1) 5RU LPU (2) 16RU PABs	1 or 2	1 16	2	1 16
VAX-7500DA, 4800XX, 12000AN, 9000AT	(1) 5RU LPU (3) 16RU PABs	2	1 24	3	1 24
VAX-10000DA, 6400XX, 16000AN, 12000AT	(1) 5RU LPU (4) 16RU PABs	2	1 32	4	1 32

- A models discontinued Aug. 2012

VAX EFFICIENCY ESTIMATES

Approximations:

Single Cabinet Systems (two PABs) – 25%

Larger Multi-Cabinet Systems – 30%

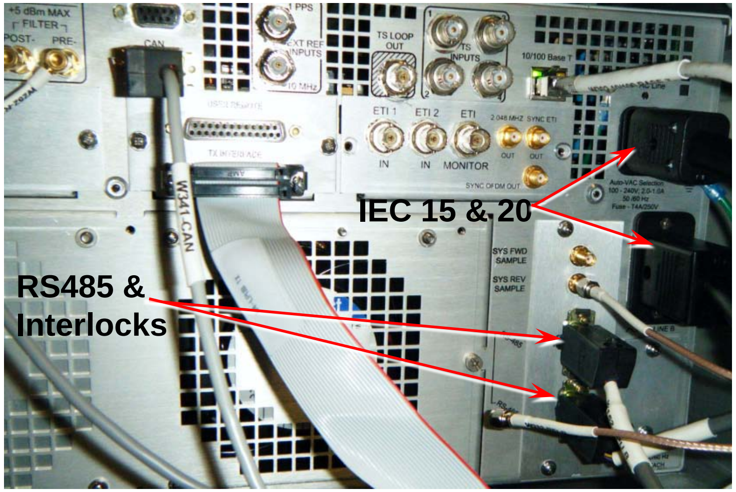
Pallets – 40%

PS – 90%

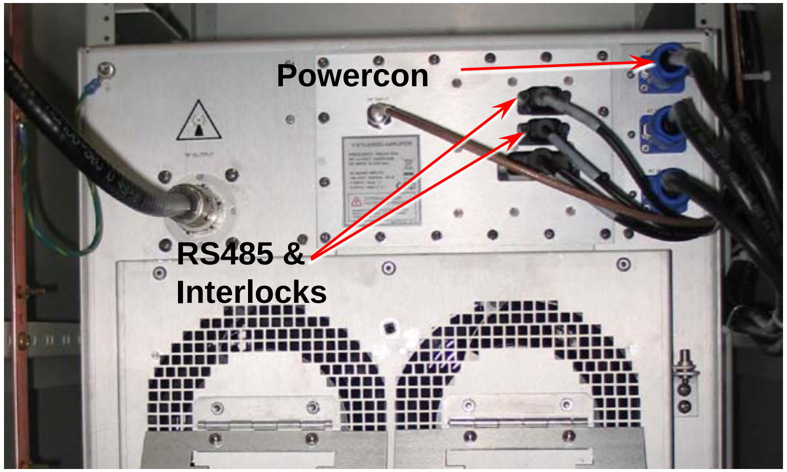
LPU – 11.5%

PLATINUM VAX – OPERATING VOLTAGES

- Standalone = Rack w/o AC dist. panel or no rack. Just components up to 1 kW.
  - LPU (low power units): Single phase, 110 - 240VAC, 47-63 Hz, one IEC C15 and one IEC C20 inlet.
- The two PA module PAB chassis has dual 100-240 VAC 50/60Hz single-phase feeds via IEC C20 inlets. The two inputs are completely independent and may be wired to separate AC phases for increased redundancy.
- The PAB four PA amplifier chassis has three 208-240 VAC 50/60Hz single-phase feeds via IEC C20 inlets. The three inputs are completely independent.
- The PAB eight PA amplifier chassis has three 208-240 VAC 50/60Hz single-phase feeds via Powercon inlets. The three inputs are completely independent.



LPU Rear



8 Module PAB Rear

PLATINUM VAX – OPERATING VOLTAGES

- Transmitters are configurable on-site for single or three phase AC connection. Loads are split to keep max components on line if phase is lost.

- If three phase power is used then supply voltage (per phase) must be between 208 & 240VAC for LPUs and PABs.

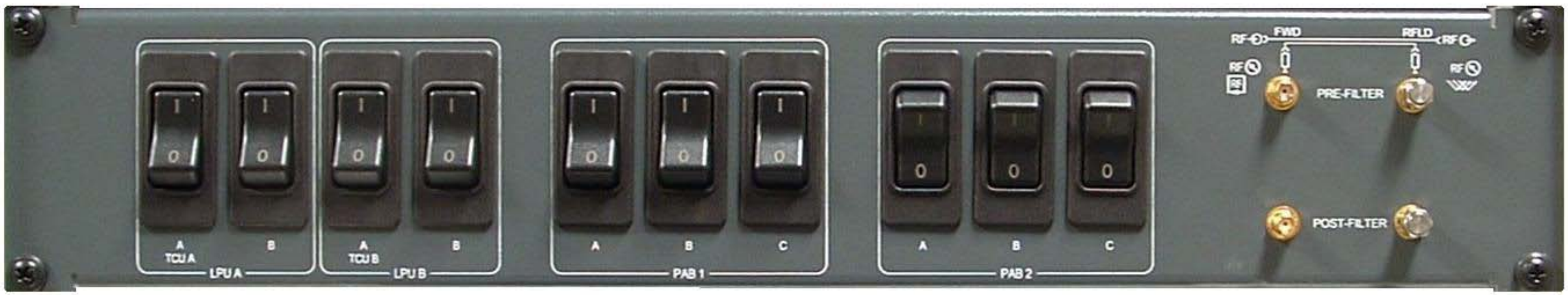
- Check voltage at plugs 1 at a time before initial turn on.

- An optional in-rack AC distribution chassis (deluxe rack) provides individual circuit breaker protection for each AC input. AC distribution panel not included in basic rack.

- Refer to the wiring diagram, AC distribution drawing 843-5610-065 for more detail.

PLATINUM VAX – AC DISTRIBUTION PANEL

- An optional in-rack AC distribution chassis provides individual circuit breaker protection for each AC input. AC distribution panel not included in basic rack.



- Refer to the wiring diagram, AC distribution drawing 843-5610-065 for more detail. Section 1 in drawing package.
- If the rack option is not purchased see outline drawings for appropriate mode to get wiring and breaker sizing.

PLATINUM VAX – AC DISTRIBUTION PANEL

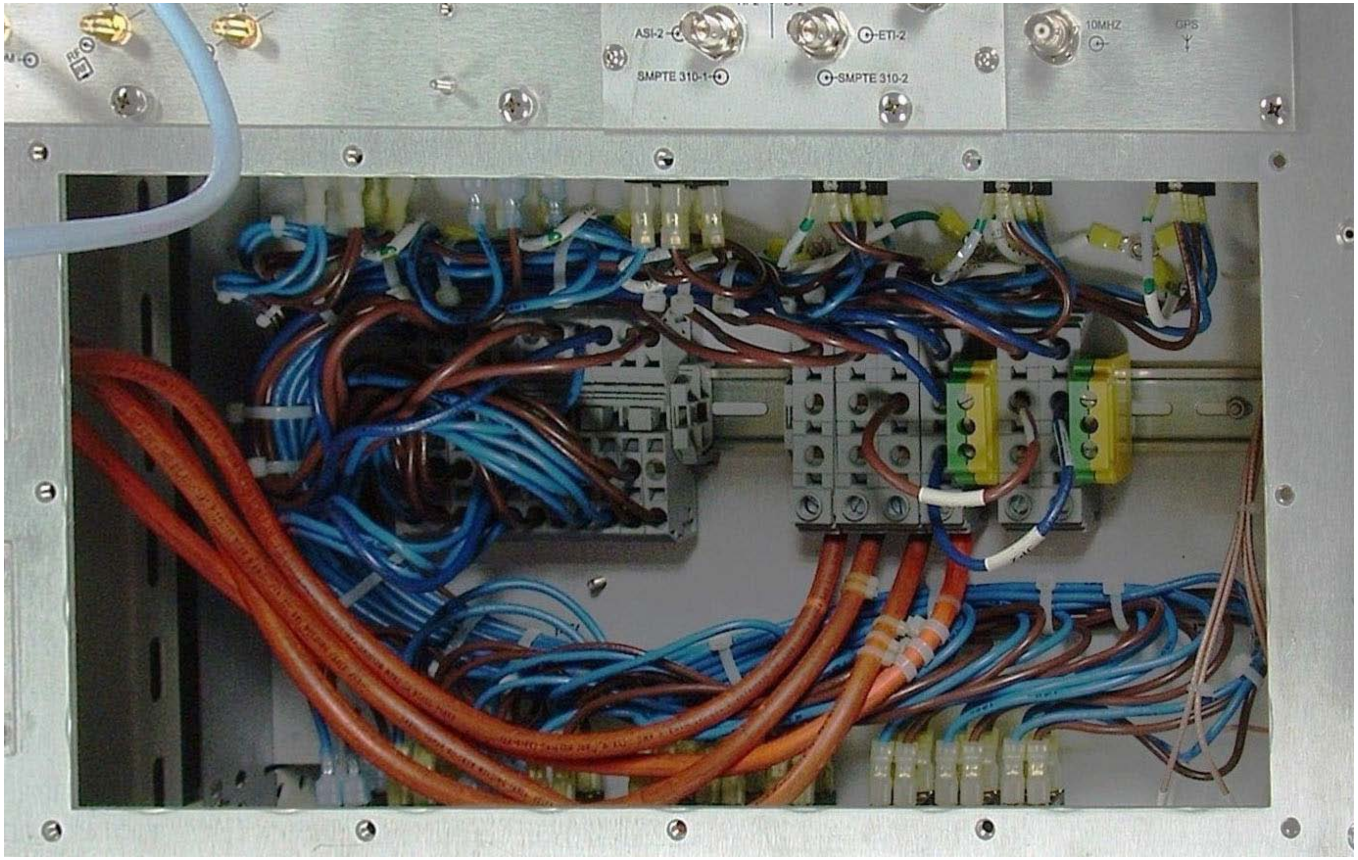
- An optional in-rack AC distribution chassis that includes an emergency stop button, AC mains switch, and convenience outlet also available.

Schuko Connector
(without breaker)



Wiring instructions for emergency stop button found on 839-8132-413 (Section 100, Sheet 1).

PLATINUM VAX – AC DISTRIBUTION PANEL



Access panel at top of cabinet removed to reveal AC distribution panel chassis.

PLATINUM VAX – OPERATING VOLTAGES

- The PAB chassis accepts these mains configurations when appropriate external wiring is provided:
  - Single-phase 208V-240V (L1+N, L1+N, L1+N)
  - Single-phase 208V-240V (L1+L2, L1+L2, L1+L2)
  - Three-phase “delta”, 208V-240V (L1+L2, L2+L3, L3+L1)
  - Three-phase “wye”, 360V-415V (measures 208-240VAC L1+N, L2+N, L3+N) (only time neutral is used….do not fuse or switch neutral)

- Components always fed with 208-240VAC. <190VAC gives AC1, 2 or 3 fault. Restarts when voltages >190VAC.

- The four PA module PAB is essentially the same as the eight PA module PAB, except for the number of PAs, PSs and a different combiner (8x output assy.).

PLATINUM VAX – OPERATING VOLTAGES

- Since the three mains inputs are completely independent, it is not necessary to observe a certain phase rotation or even phase balance.

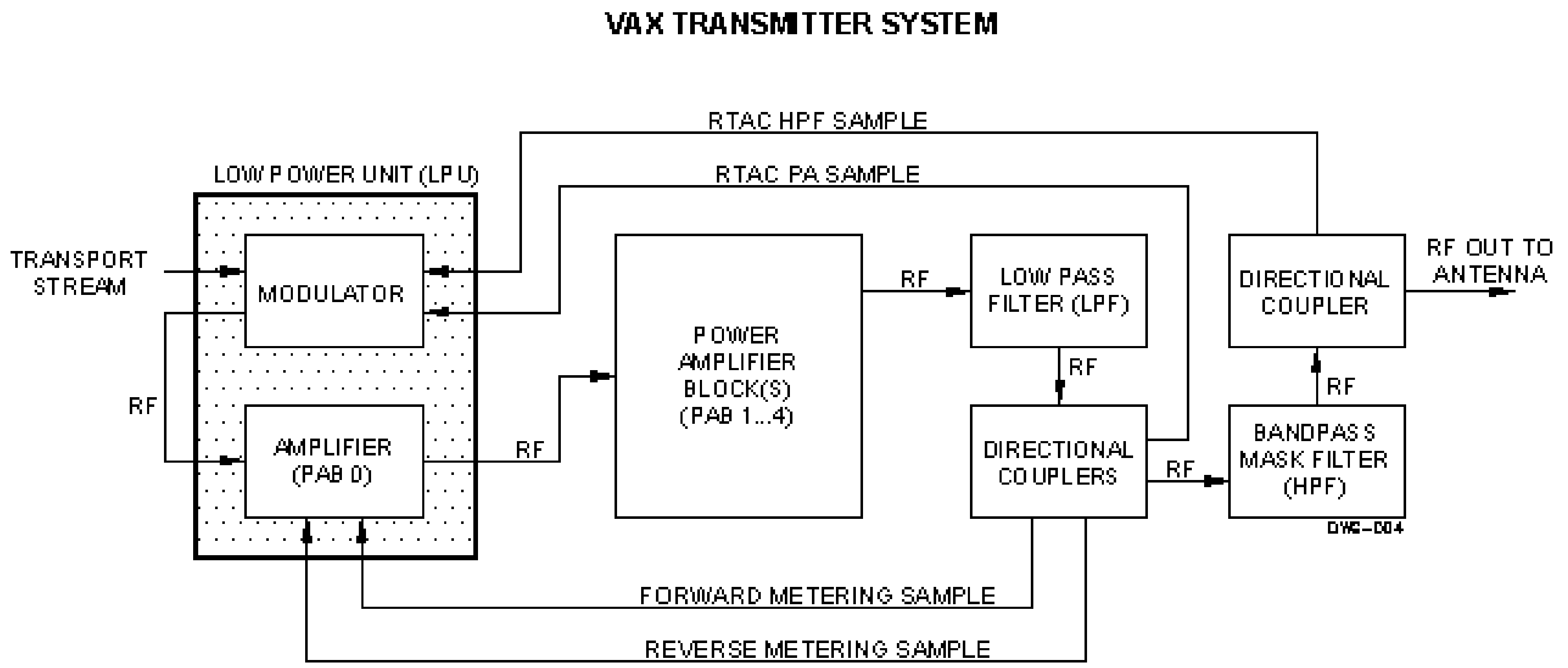
- The PAB chassis can operate indefinitely (at a reduced power) with one or two of the mains inputs missing. The internal power supplies connected to each input will continue to operate provided that the incoming mains power at that input falls within the voltage range indicated above.

PLATINUM VAX OPTIONS/ACCESSORIES

- Internal GPS receiver
- GPS antenna and RF cable
- UPS to keep LPU exciter section and TCU alive during power failure
- Internal battery back up for LPU. Provides 15-20 minutes backup for frequency processing circuits.
- Dual LPU’s (dual drives)
- Air plenum – ducted air system
- SFN
- Emergency Stop Button
- Isolator Switch (European versions)



PLATINUM VAX BLOCK DIAGRAM



VAX Documentation Package Contains:

Technical Manual 888-2717-001 (English)

Drawing Package 917-2323-234

Note:

Manuals not yet available in other languages.

817-2323-234 COVER SHEET FIRST PAGE IN DRAWING PACKAGE

817–2323–234 VAX DWG PACKAGE COVER S

SECTION - 100 4/8-PA XMTR

- 8398464263 OUTLINE DWG, VAX MODEL DATA **2-1**
- 8172311156 DWG, FAMILY TREE, VAX-4PA
- 8172311157 DWG, FAMILY TREE, VAX-8PA
- 8398464279 OUTLINE DWG, VAX-4/8PA **2-1**
- 8398132413 WIRING DIAGRAM, VAX-4/8/16/24/32PA **2-4**
- **2-3**: 8398132448 WIRING DIAGRAM, VAX-5RU
- **2-3**: 8398132449 WIRING DIAGRAM, STAND ALONE VAX LPU/2PA/4PA/8PA
- 8172311158 DWG, FAMILY TREE, VAX-16PA
- 8398464280 OUTLINE DWG, VAX-16PA **2-1**
- 8172311159 DWG, FAMILY TREE, VAX-24PA **2-1**
- 8398464281 OUTLINE DWG, VAX-24PA
- 8172311160 DWG, FAMILY TREE, VAX-32PA
- **2-1**: 8398464282 OUTLINE DWG, VAX-32PA
- **2-1**: 8398464283 OUTLINE DWG, VAX-2PA
- **2-1**: 8010224041 SCH, UAX/VAX CUST. I/O
- **2-1**: 8435610065 AC DISTRIBUTION PANEL

SECTION - 200 DRIVE UNIT & 10-150W XMTR

- **2-2**: 8435610021 WIRING DIAGRAM VAX 10/150W XMTR
- **2-2**: 8010215061 SCH, TRANSMITTER I/O
- **2-2**: 8010215081 SCH, LVPS DISTRIBUTION
- **2-2**: 8010223091 SCH, FRONT PANEL
- **2-2**: 8010230001 SCH, VAX AMP CONTROL
- **2-2**: 8010230011 SCH, VAX 2X PS INTERFACE

SECTION - 300 POWER BLOCK 4/8PA XMTR

- **2-5**: 8010203301 SCH, BIII 8X SPLITTER
- **2-5**: 8010203321 SCH, 16X LOAD
- **2-5**: 8010203331 SCH, BIII 8X PS INTERFACE
- **2-5**: 8010203341 SCH, BIII PA BACKPLANE
- **2-5**: 8010203351 SCH, BIII I/O
- **2-5**: 8010203361 SCH, BIII FRONT PANEL
- **2-5**: 8010203371 SCH, BIII RS-485
- **2-5**: 8010203401 SCH, IPA BACKPLANE
- **2-5**: 8010203441 SCH, FAN MONITOR
- 8010230021 SCH, E5600 BAND III PA **3-1**
- **2-5**: 8398464066 SCH, BIII 16X OUTPUT ASSE
- **2-5**: 8398464305 WIRING DIAGRAM, AC-DC IN
- **2-5**: 8398464068 WIRING DIAGRAM, RF INTEF
- **2-5**: 8398464075 SCH, BIII 8X OUTPUT ASSEN
- **2-5**: 8398464304 WIRING DIAGRAM, AC-DC IN
- **2-5**: 8398464077 WIRING DIAGRAM, RF INTEF

SECTION - 400 POWER BLOCK 2PA XMTR

- **2-3**: 8398464306 WIRING DIAGRAM, AC-DC IN
- **2-3**: 8398464074 WIRING DIAGRAM, RF INTEF
- **2-3**: 8010203431 SCH, BIII 2X SPLITTER
- **2-3**: 8010203471 SCH, BIII 2X COMBINER
- **2-3**: 8010203491 SCH, BIII 2X PS INTERFACE
- **2-3**: 8398464307 WIRING DIAGRAM, AC-DC IN
- **2-3**: 8398464071 WIRING DIAGRAM, RF INTEF
- **2-3**: 8010203451 SCH, BIII 4X SPLITTER
- **2-3**: 8010203621 SCH, BIII 4XB COMBINER

SECTION - 500 TRANSMITTER CONTROL UN

- 8010213011 SCH, MCF5484 UC MODULE
- 8010221021 SCH, PROCESSOR CONTRC
- 8010221031 SCH, BASEPLANE
- 8010221051 SCH, POWER SUPPLY
- 8010221061 SCH, POWER SUPPLY BAC
- 8010221081 SCH, CUSTOMER I/O
- 8010221101 SCH, USER INTERFACE
- 8010221191 SCH, LAX/UAX TCU INTERFA
- 8010221211 SCH, MAIN CONTROLLER

NOTES

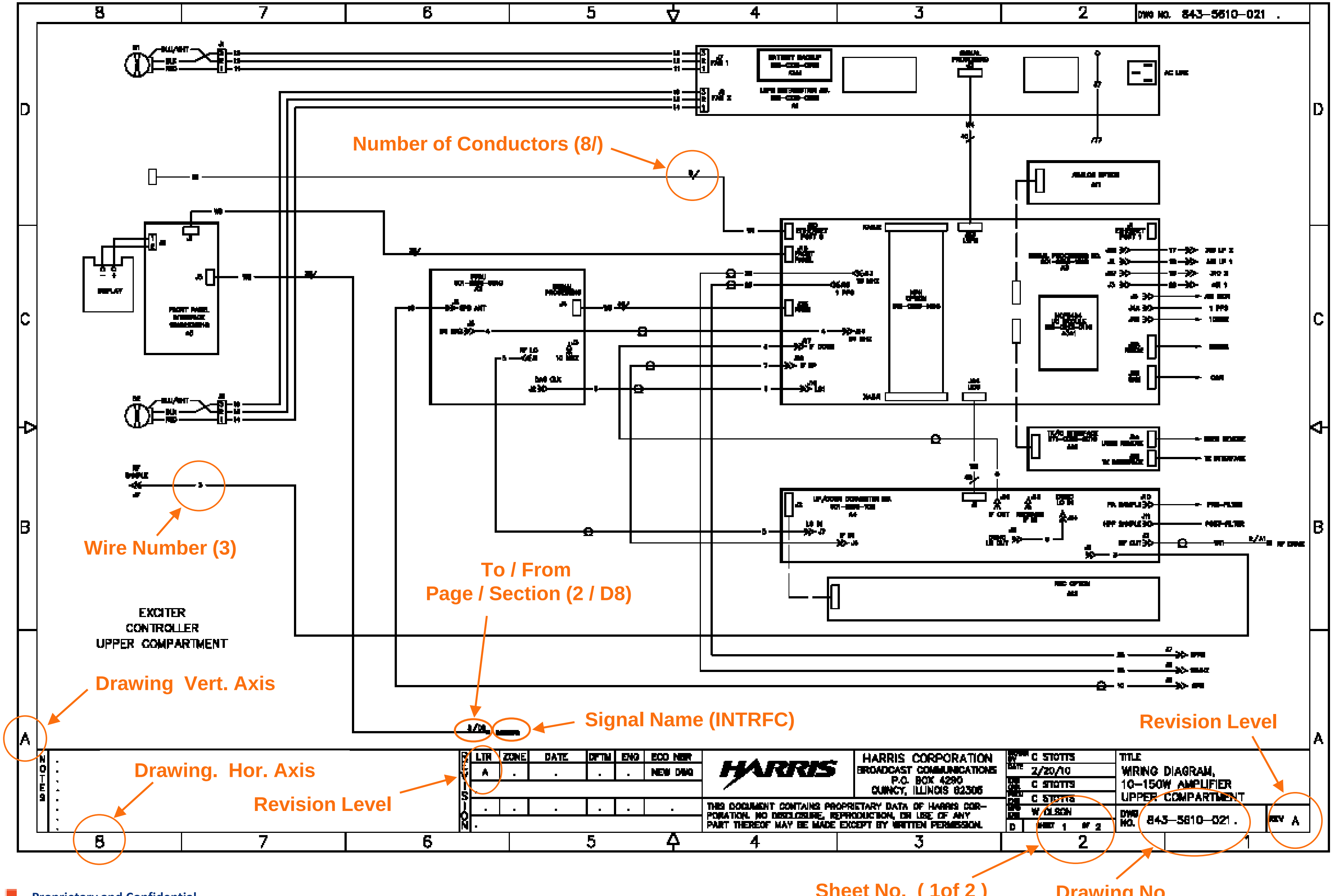
REVISION

LTR	ZONE	DATE	DFTM	ENG	ECO NBR
G	.	8/22/11	CMS	CMS	P50501
REVISED AC_DC Drawing numbers					
F	.	7/21/11	CMS	CMS	P50640
Added VAX–4PA and fixed misc issues					

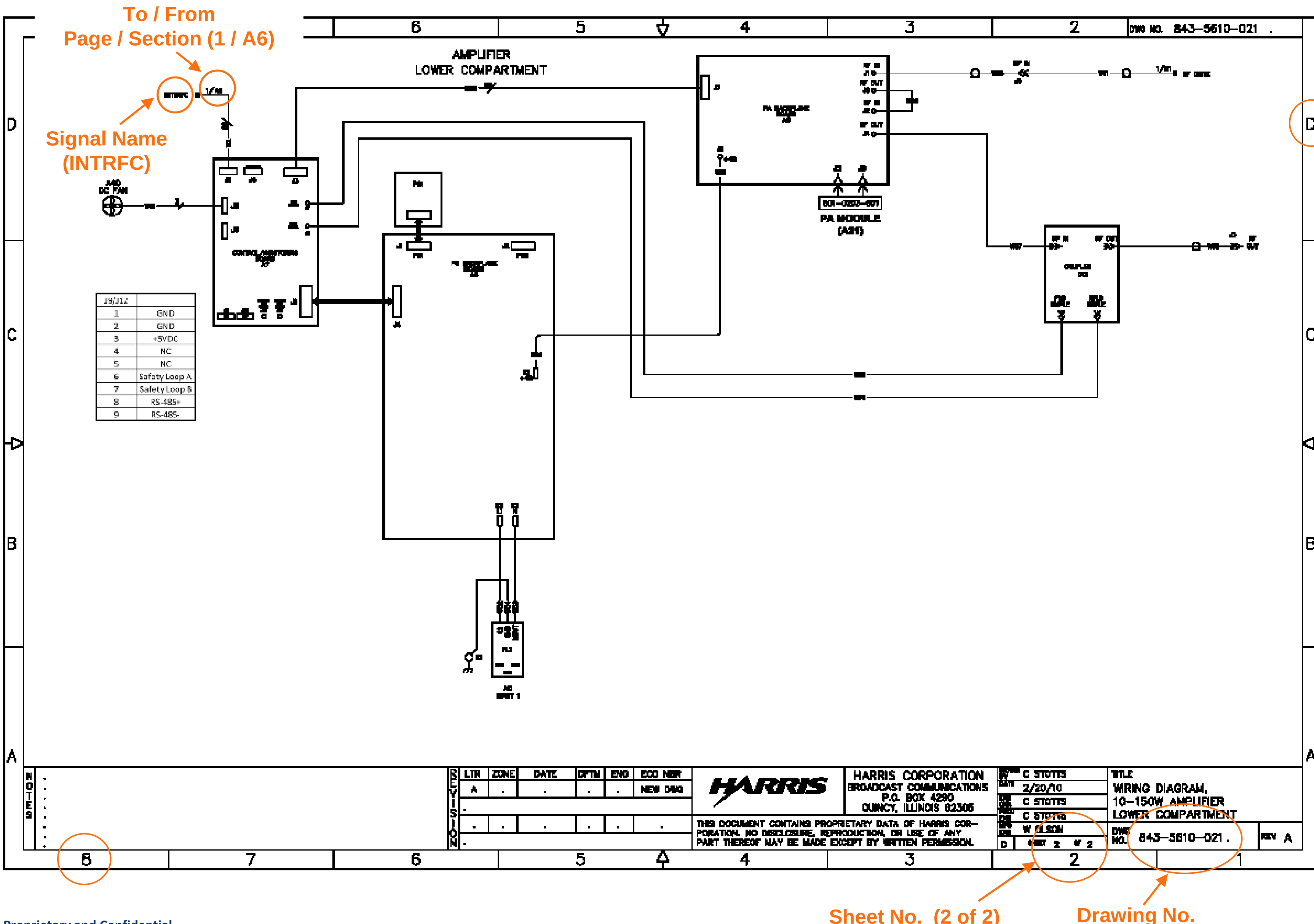
HARRIS

HARRIS CORPORATION
BROADCAST COMMUNICATIONS
P.O. BOX 4290
QUINCY, ILLINOIS 62305

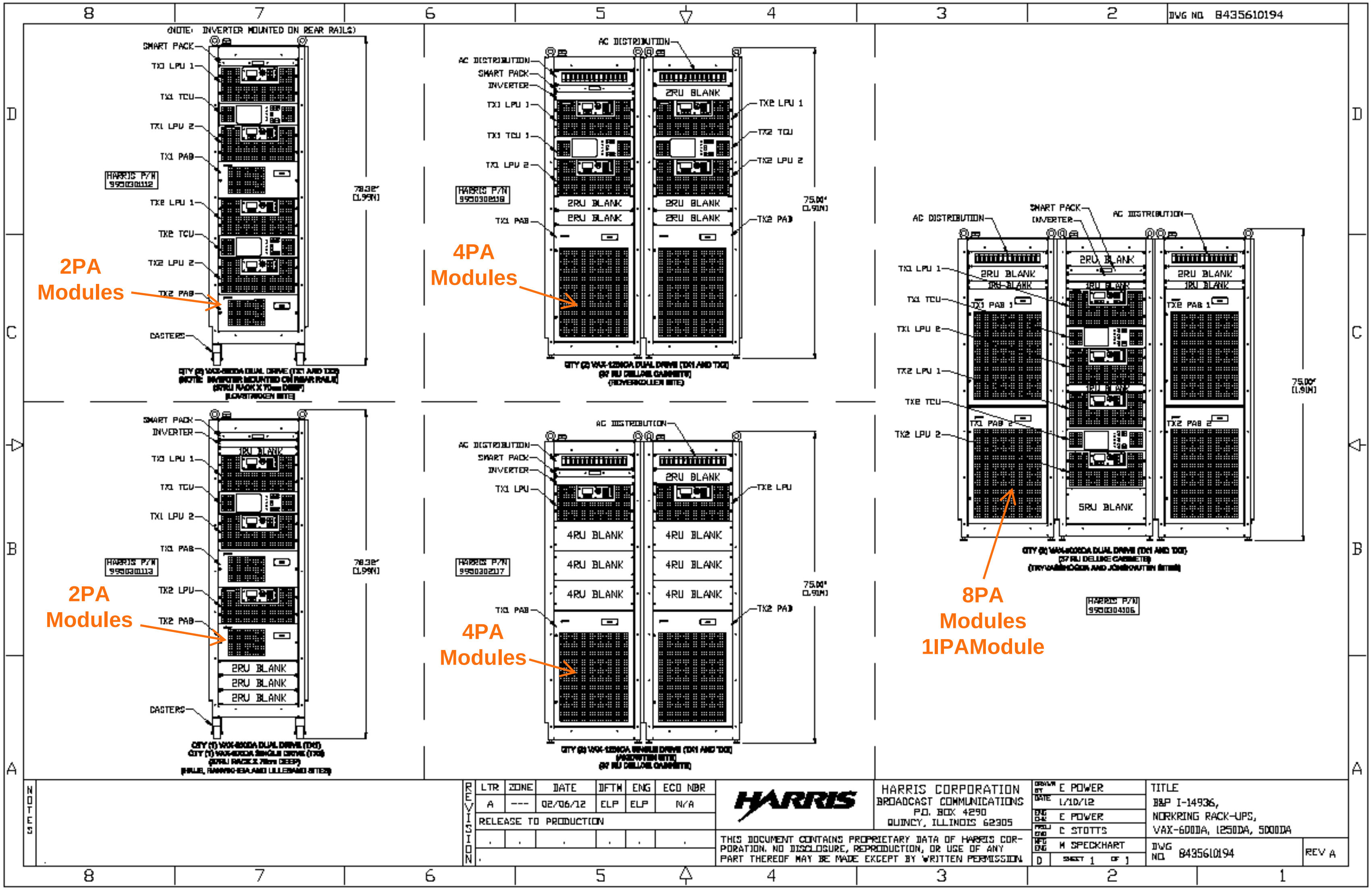
WIRING DIAGRAM 10-150 W 843-5610-021 (1 of 2) *Section 200* **Examples of Drawing Details**



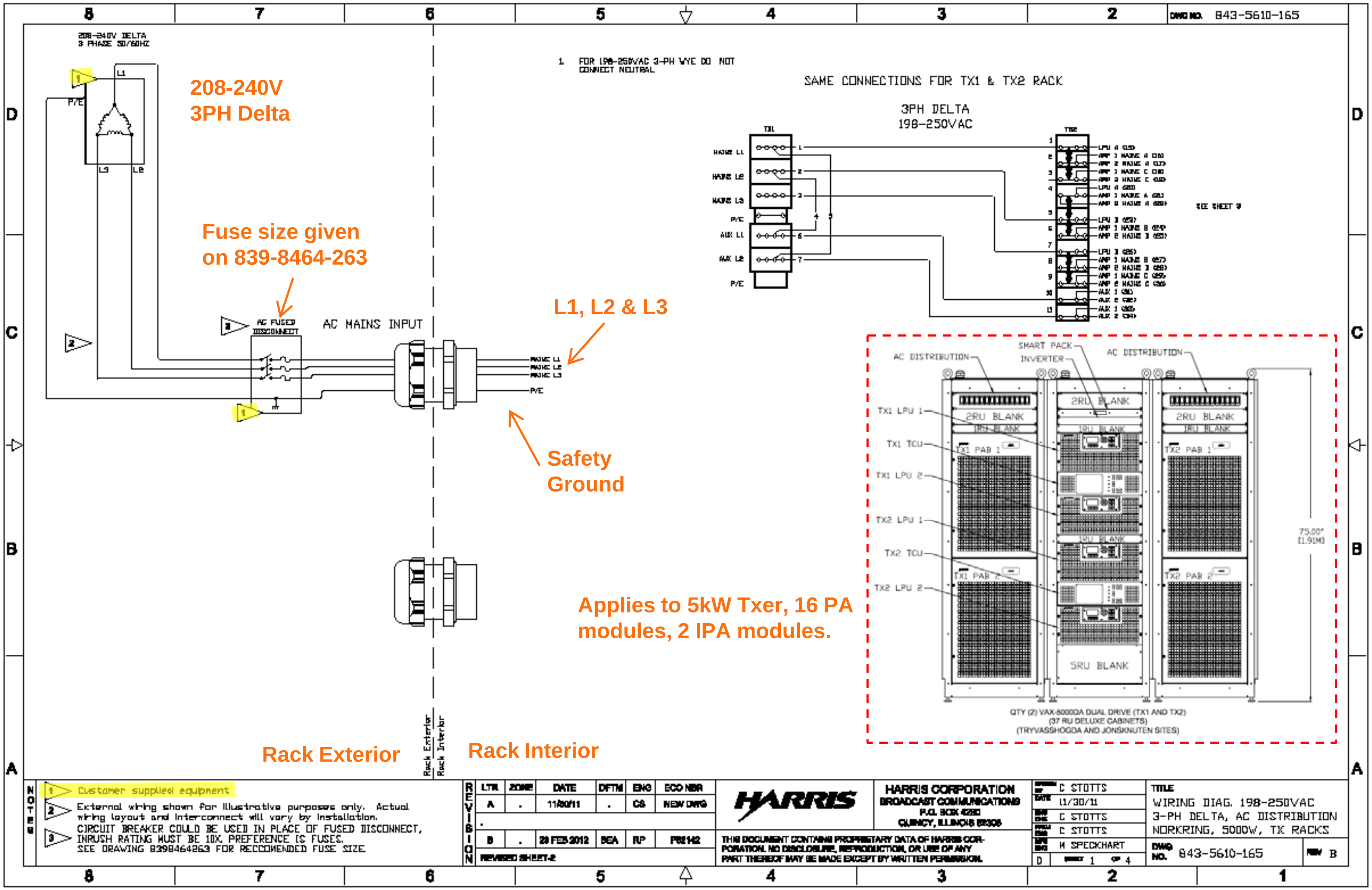
WIRING DIAGRAM 10-150 W 843-5610-021 (2 of 2) *Section 200* **Examples of Drawing Details**



843-5610-194 Phase 1 Rack-UPS

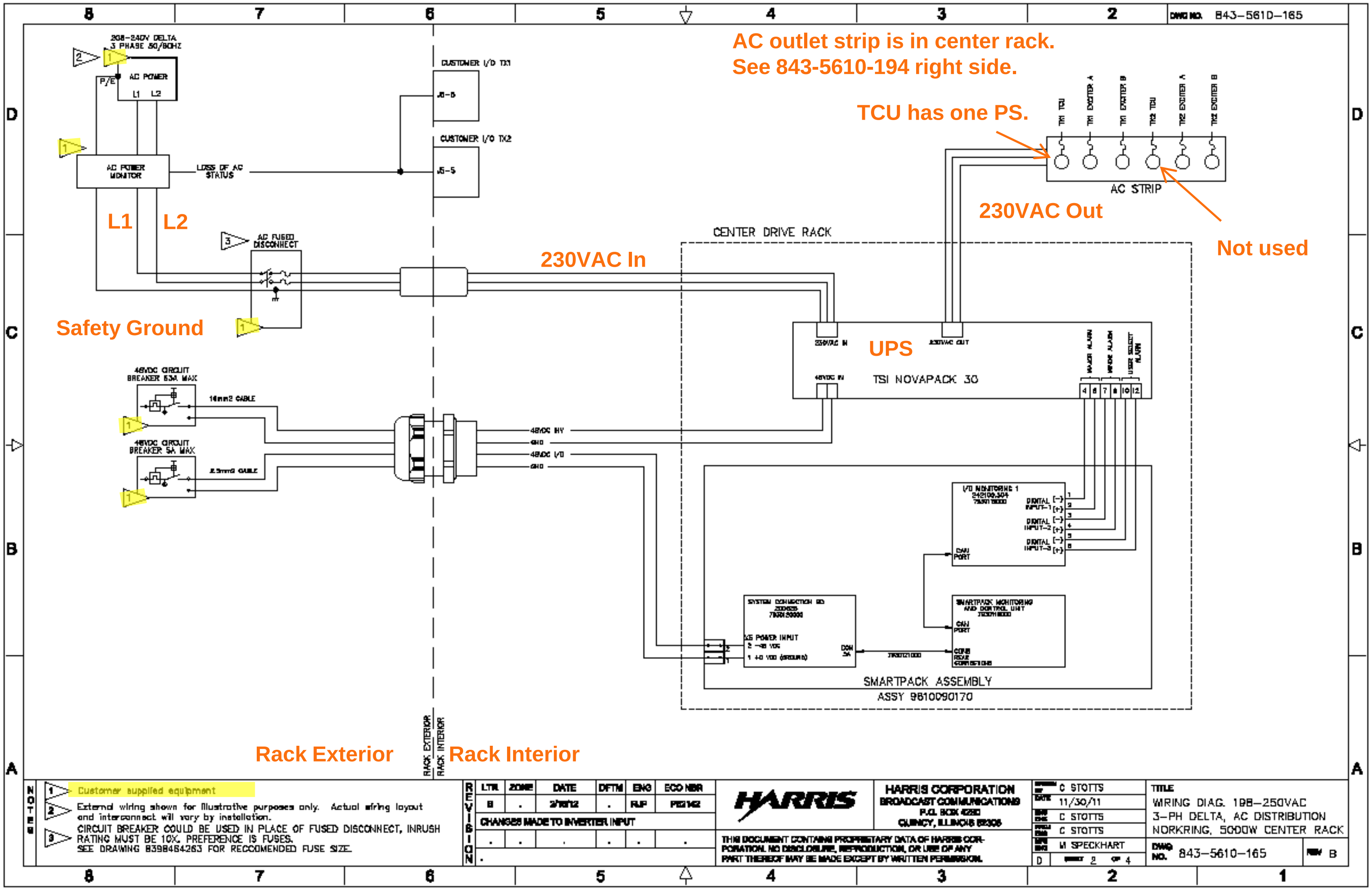


843-5610-165 Wiring Diagram 198-250VAC, 3-Ph AC Distribution, 5000W



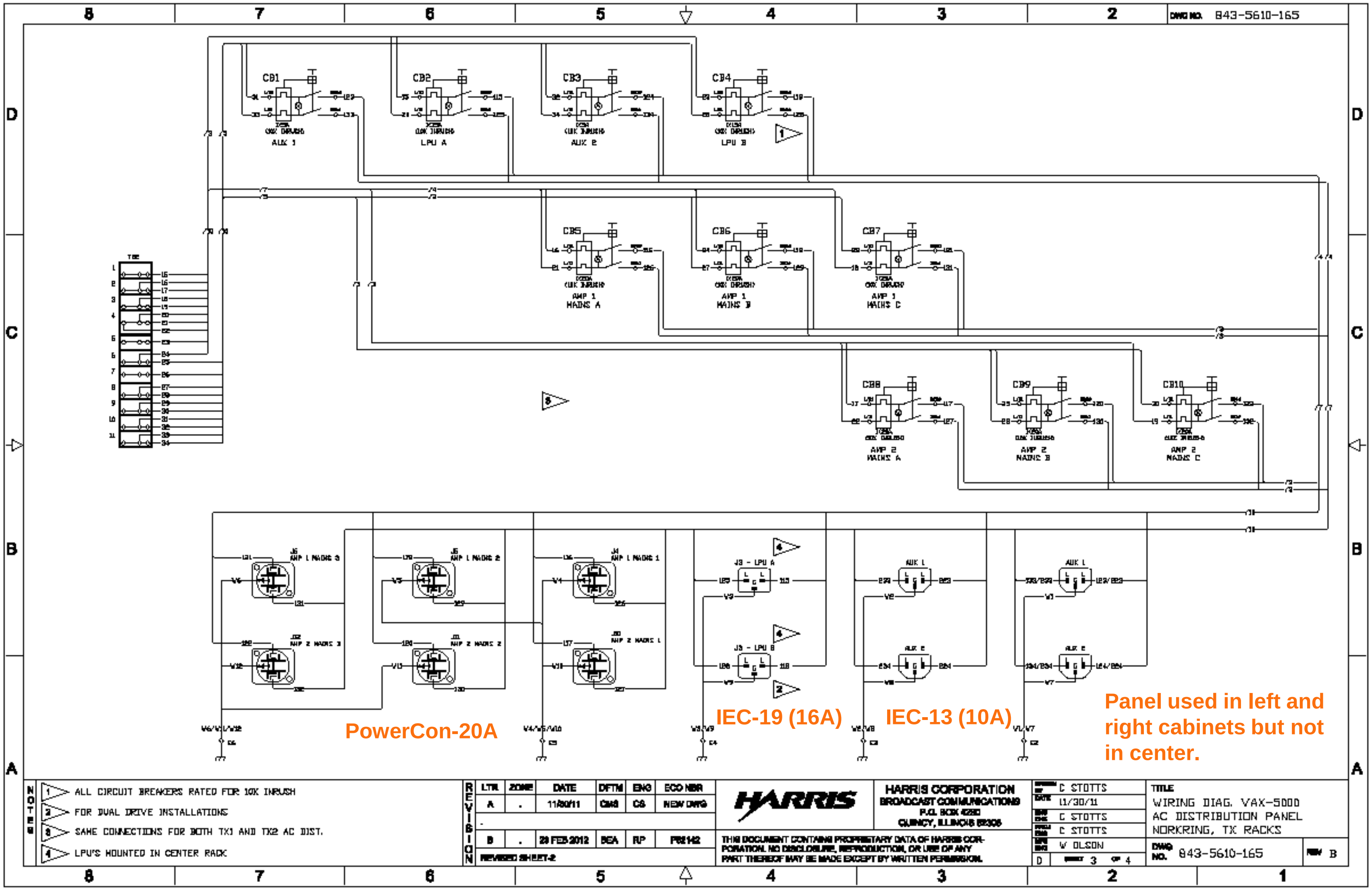
1 of 4

843-5610-165 Wiring Diagram 198-250VAC, 3-Ph AC Distribution 5000W, TX Racks



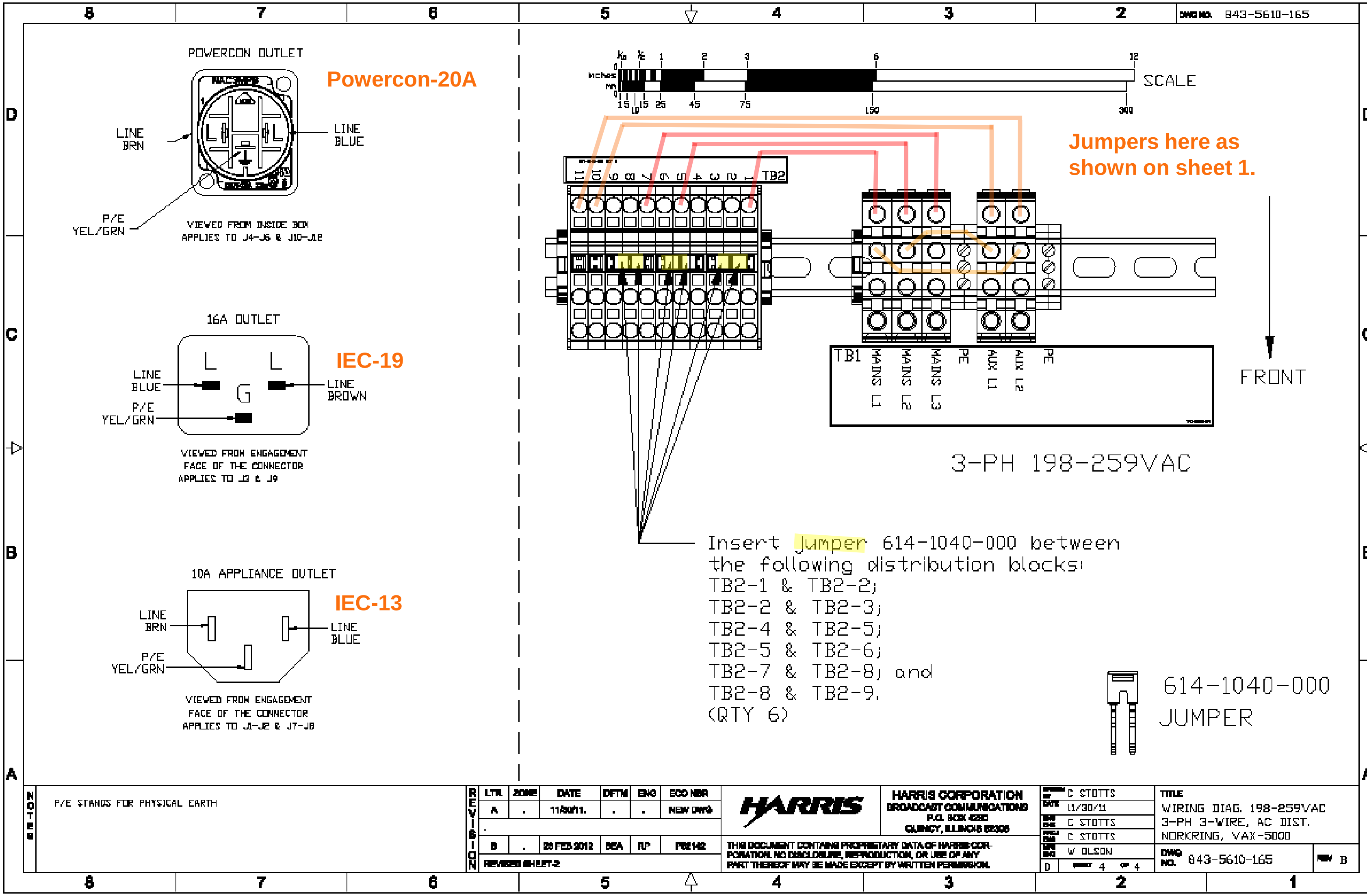
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843-5610-165 Wiring Diagram 198-250VAC, 3-Ph AC Distribution, 5000W, TX Racks

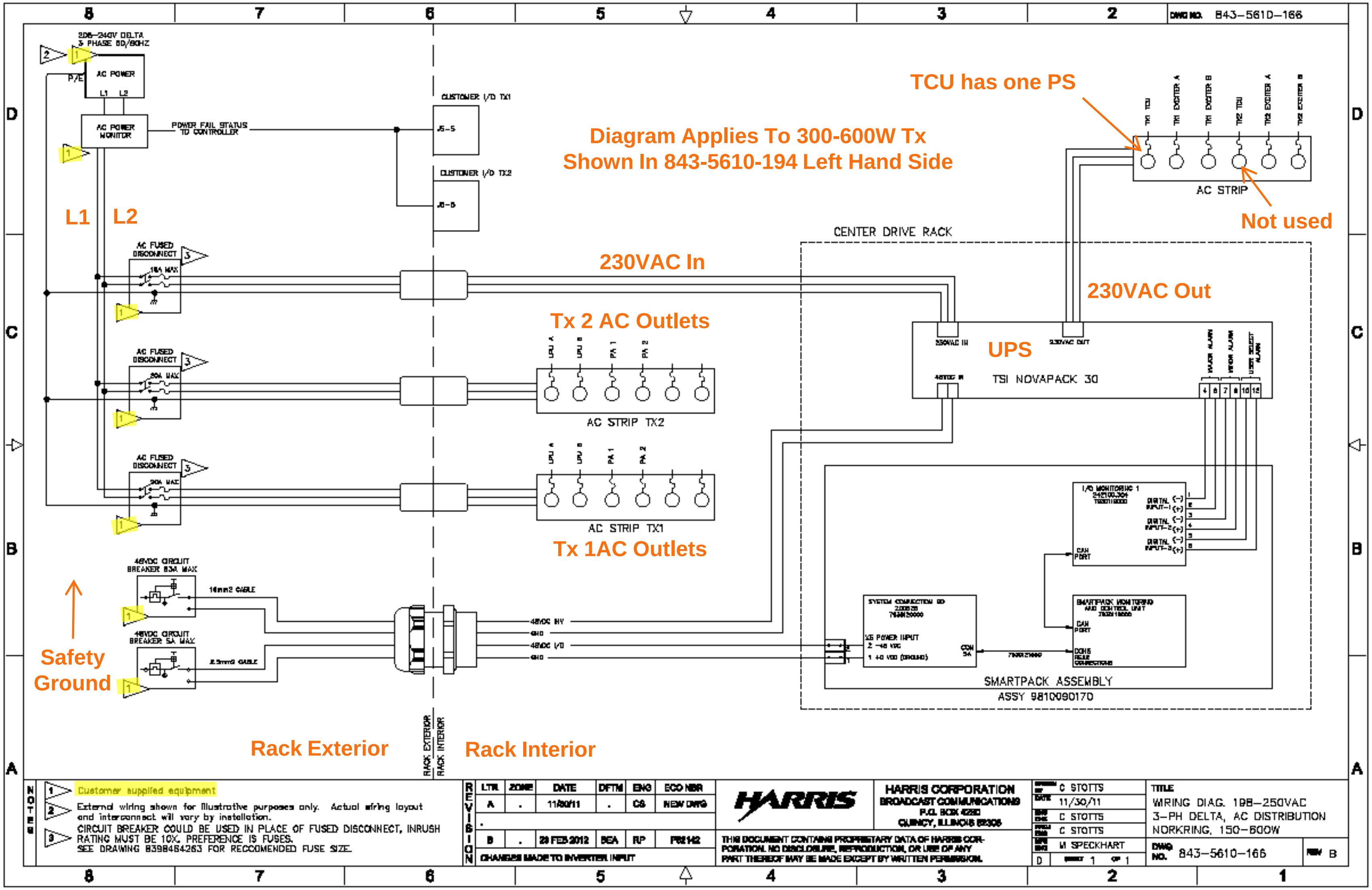


3 of 4

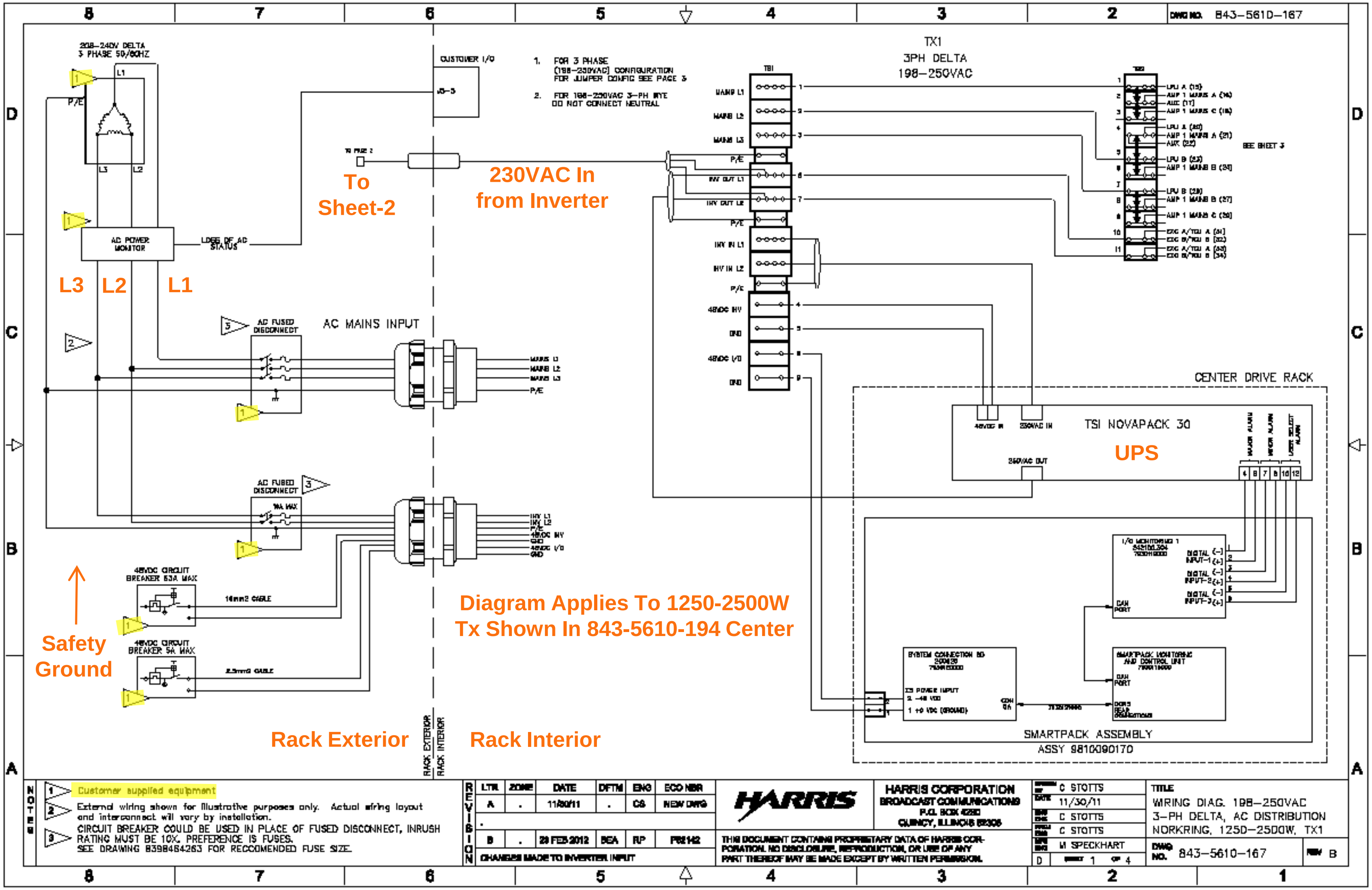
843-5610-165 Wiring Diagram 198-250VAC, 3-Ph AC Distribution, 5000W, TX Racks



843-5610-166 Wiring Diagram 198-250VAC, 3-Ph Delta AC Distribution, 150-600W

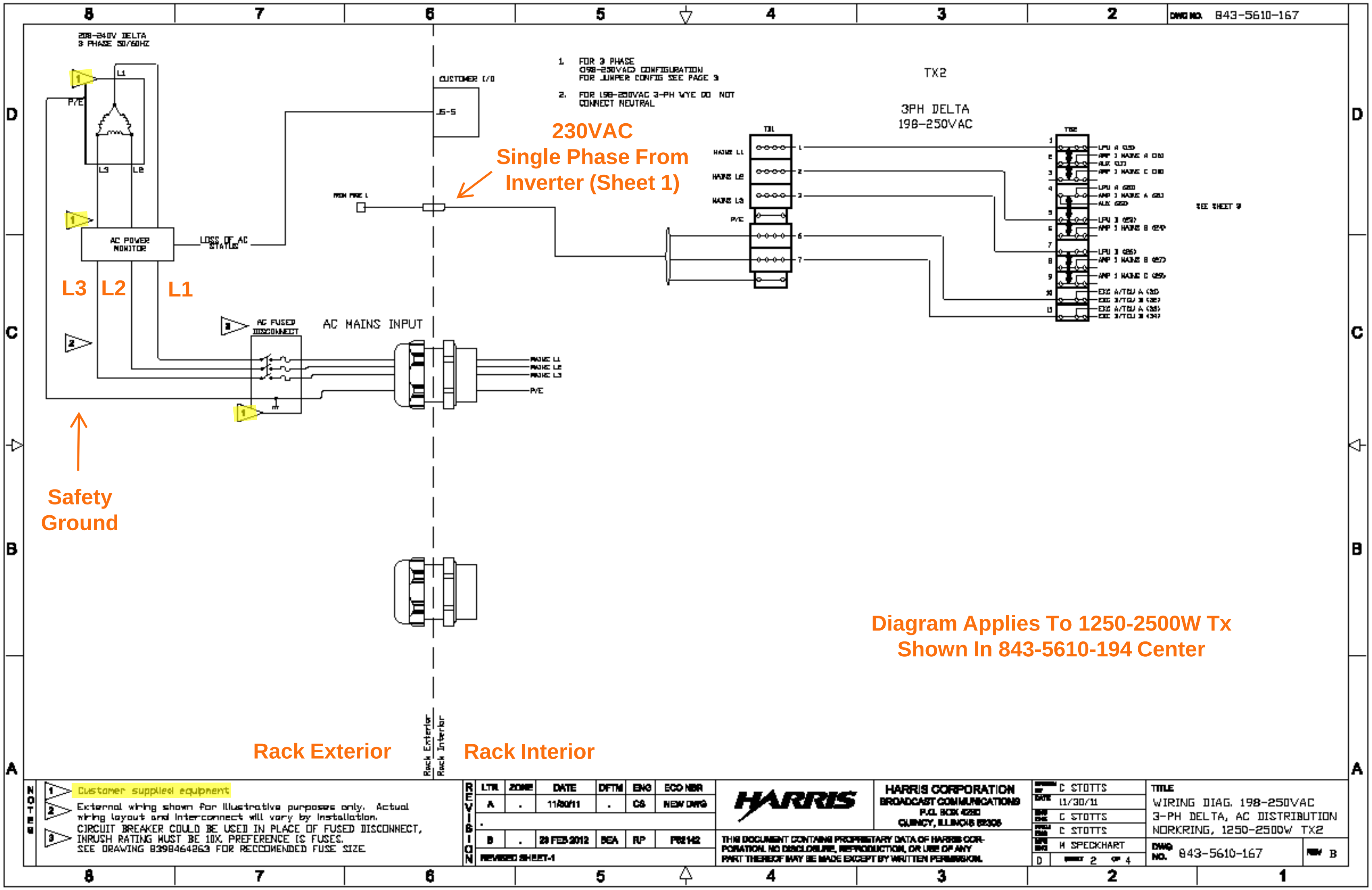


1 of 1



TX1
3PH DELTA
198–250VAC
208–240V DELTA
3 PHASE 50/60HZ
AC POWER MONITOR
LOSS OF AC STATUS
CUSTOMER I/O
To Sheet-2
230VAC In from Inverter
L3
L2
L1
AC FUSED DISCONNECT
AC MAINS INPUT
48VDC CIRCUIT BREAKER 63A MAX
48VDC CIRCUIT BREAKER 5A MAX
Safety Ground
Diagram Applies To 1250-2500W
Tx Shown In 843-5610-194 Center
Rack Exterior
Rack Interior
CENTER DRIVE RACK
TSI NOVAPACK 30
UPS
SMARTPACK ASSEMBLY
ASSY 9810090170
1. FOR 3 PHASE (198–250VAC) CONFIGURATION FOR JUMPER CONFIG SEE PAGE 3
2. FOR 198–250VAC 3–PH WYE DO NOT CONNECT NEUTRAL
Customer supplied equipment
External wiring shown for illustrative purposes only. Actual wiring layout and interconnect will vary by installation.
CIRCUIT BREAKER COULD BE USED IN PLACE OF FUSED DISCONNECT, INRUSH RATING MUST BE 10X. PREFERENCE IS FUSES. SEE DRAWING 8398484263 FOR RECCOMENDED FUSE SIZE.
HARRIS CORPORATION
BROADCAST COMMUNICATIONS
P.O. BOX 4290
QUINCY, ILLINOIS 62305
CHANGES MADE TO INVERTER INPUT
WIRING DIAG. 198–250VAC 3–PH DELTA, AC DISTRIBUTION NORKRING, 1250–2500W, TX1
DWG NO. 843–5610–167
C STOTTS
11/30/11
M SPECKHART

1 of 4



230VAC
Single Phase From
Inverter (Sheet 1)
TX2
3PH DELTA
198-250VAC
AC MAINS INPUT
L3
L2
L1
Safety
Ground
Diagram Applies To 1250-2500W Tx
Shown In 843-5610-194 Center
Rack Exterior
Rack Interior
Customer supplied equipment
External wiring shown for illustrative purposes only. Actual wiring layout and interconnect will vary by installation.
CIRCUIT BREAKER COULD BE USED IN PLACE OF FUSED DISCONNECT, INRUSH RATING MUST BE 10X. PREFERENCE IS FUSES.
SEE DRAWING 8398464263 FOR RECCOMENDED FUSE SIZE.
HARRIS
HARRIS CORPORATION
BROADCAST COMMUNICATIONS
WIRING DIAG. 198-250VAC
3-PH DELTA, AC DISTRIBUTION
NORKRING, 1250-2500W TX2
843-5610-167

2 of 4

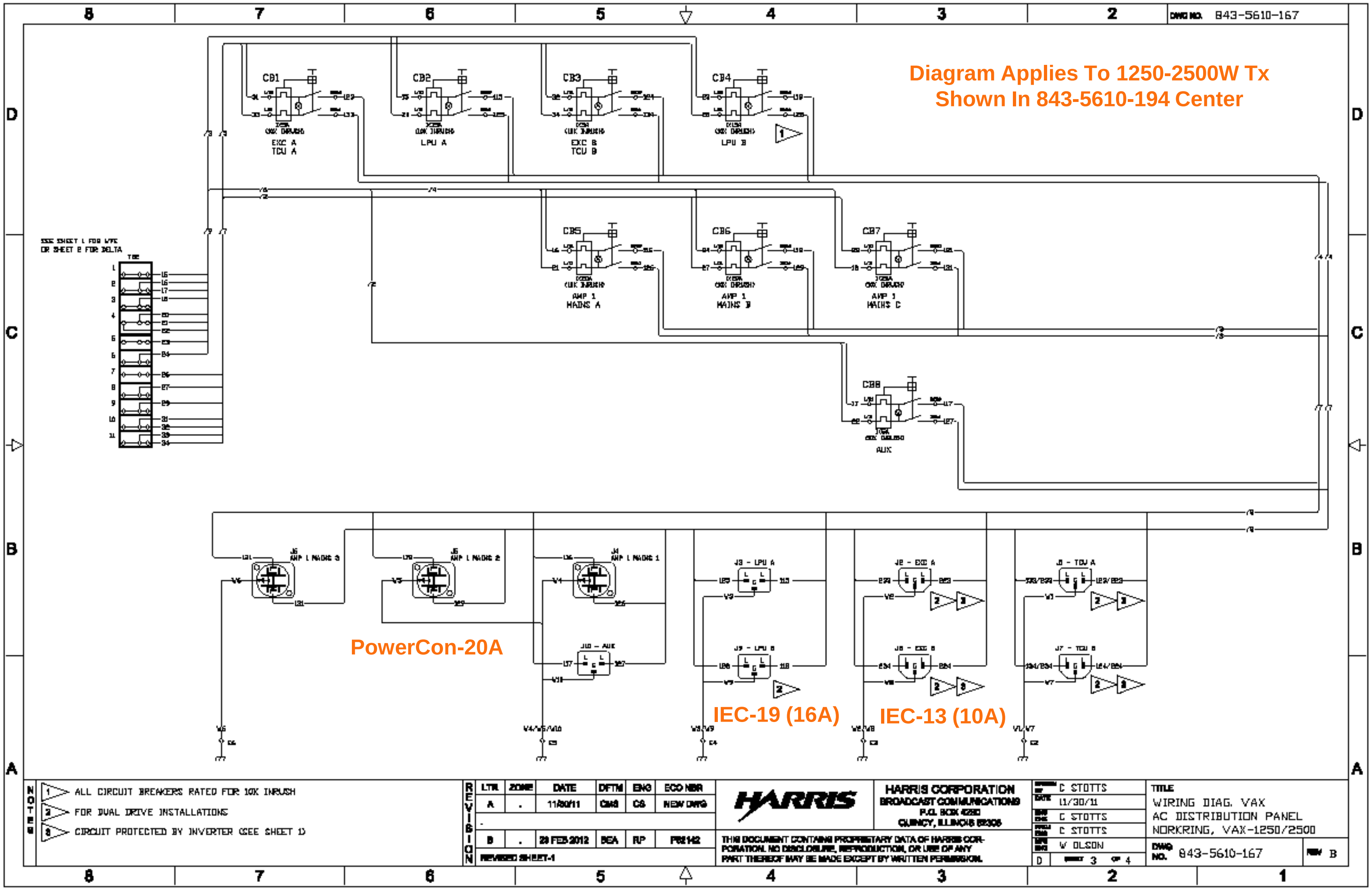
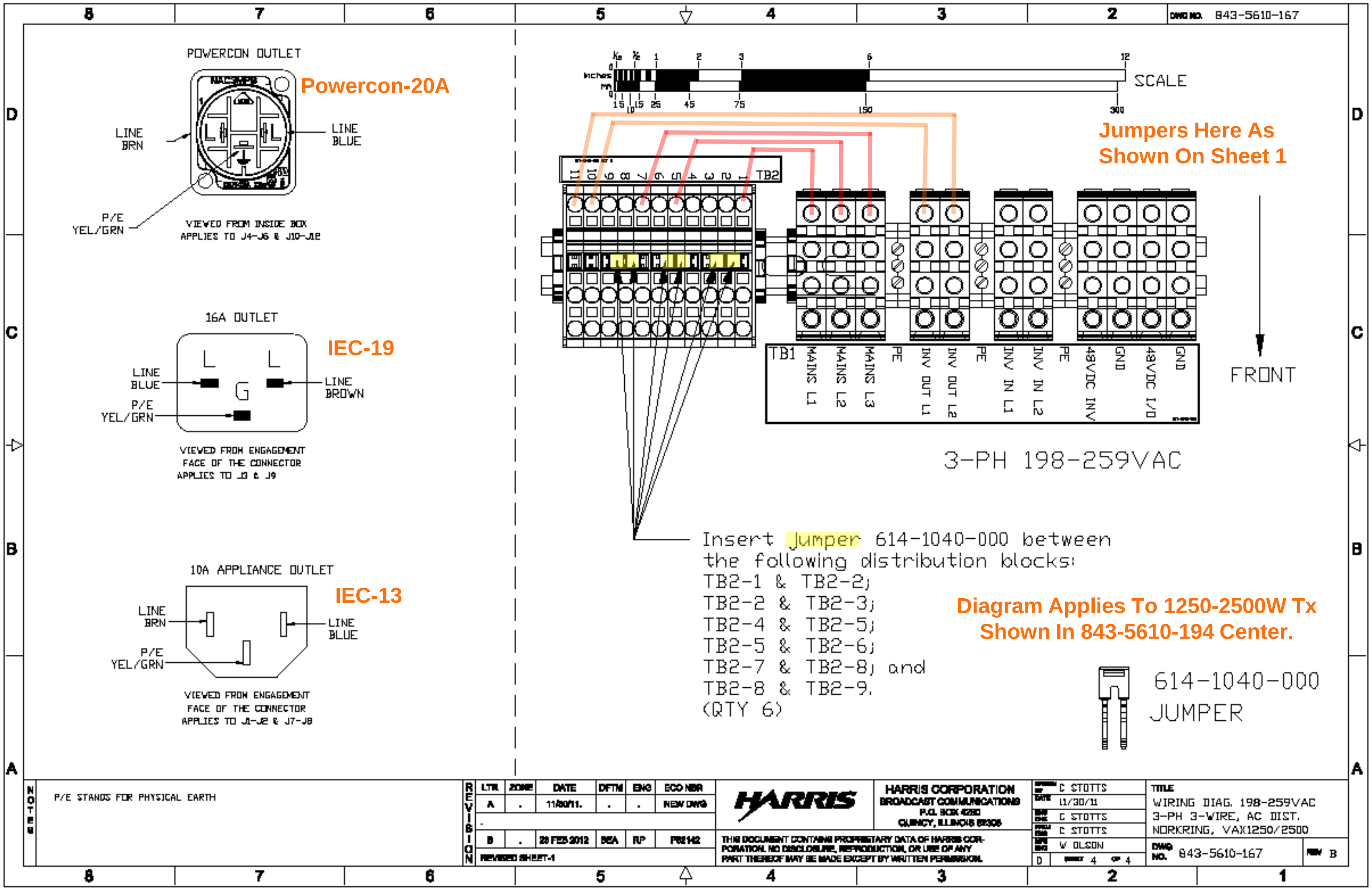


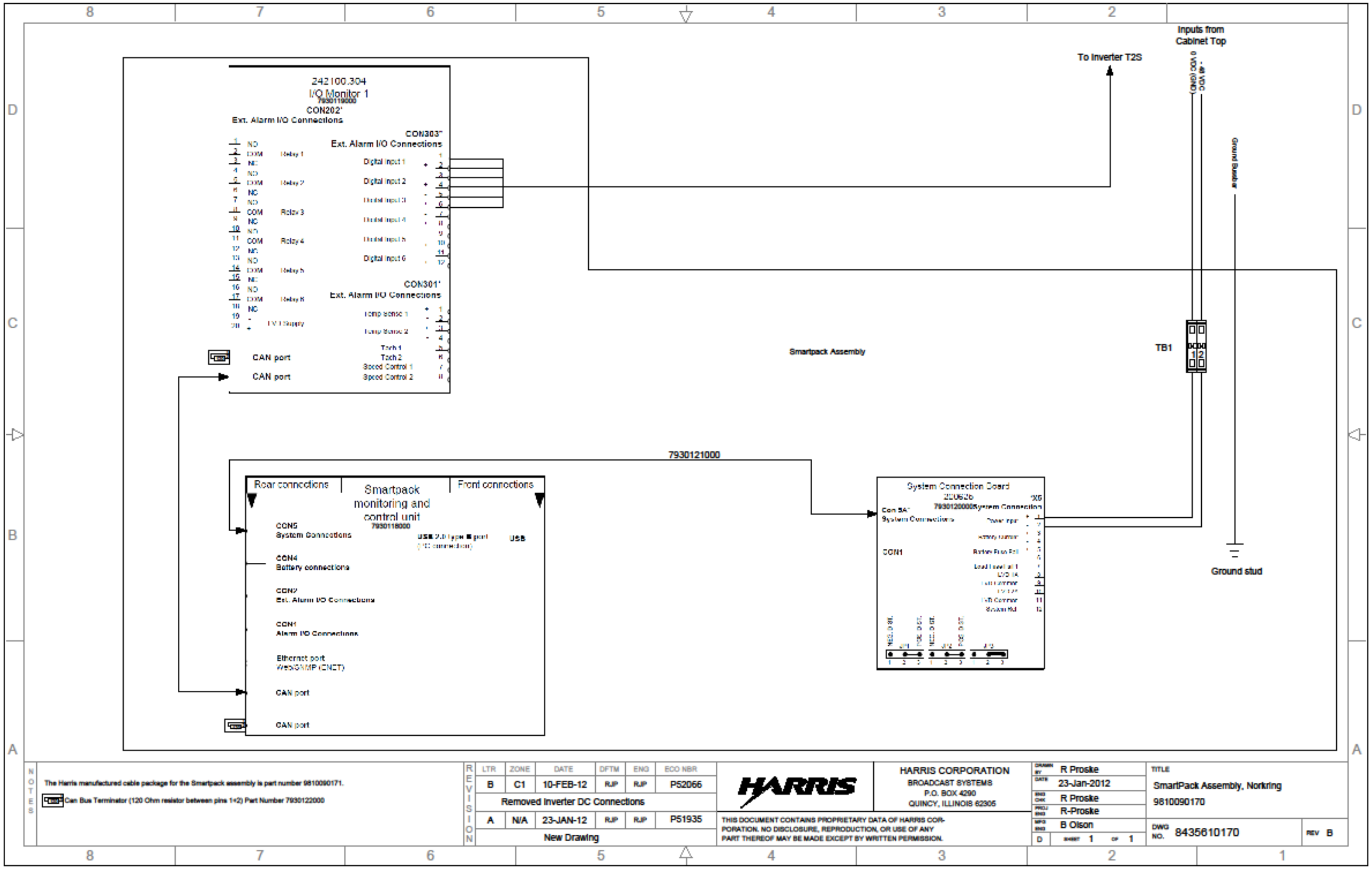
Diagram Applies To 1250-2500W Tx
Shown In 843-5610-194 Center
PowerCon-20A
IEC-19 (16A)
IEC-13 (10A)
CB1
CB2
CB3
CB4
CB5
CB6
CB7
CB8
EXC A
TCU A
LPU A
EXC B
TCU B
LPU B
AMP 1
MAINS A
MAINS B
MAINS C
AUX
J3 - LPU A
J2 - EXC A
J1 - TCU A
J9 - LPU B
J8 - EXC B
J7 - TCU B
J10 - AUX
NOTES
1 ALL CIRCUIT BREAKERS RATED FOR 10X INRUSH
2 FOR DUAL DRIVE INSTALLATIONS
3 CIRCUIT PROTECTED BY INVERTER (SEE SHEET 1)
A 11/30/11 CMS CS NEW DWG
B 29 FEB 2012 BEA RP F82142
REVISED SHEET-1
HARRIS
HARRIS CORPORATION
BROADCAST COMMUNICATIONS
P.O. BOX 4290
QUINCY, ILLINOIS 62305
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C STOTTS
11/30/11
V OLSON
WIRING DIAG. VAX
AC DISTRIBUTION PANEL
NORKRING, VAX-1250/2500
DWG NO. 843-5610-167
REV B
SHEET 3 OF 4

3 of 4

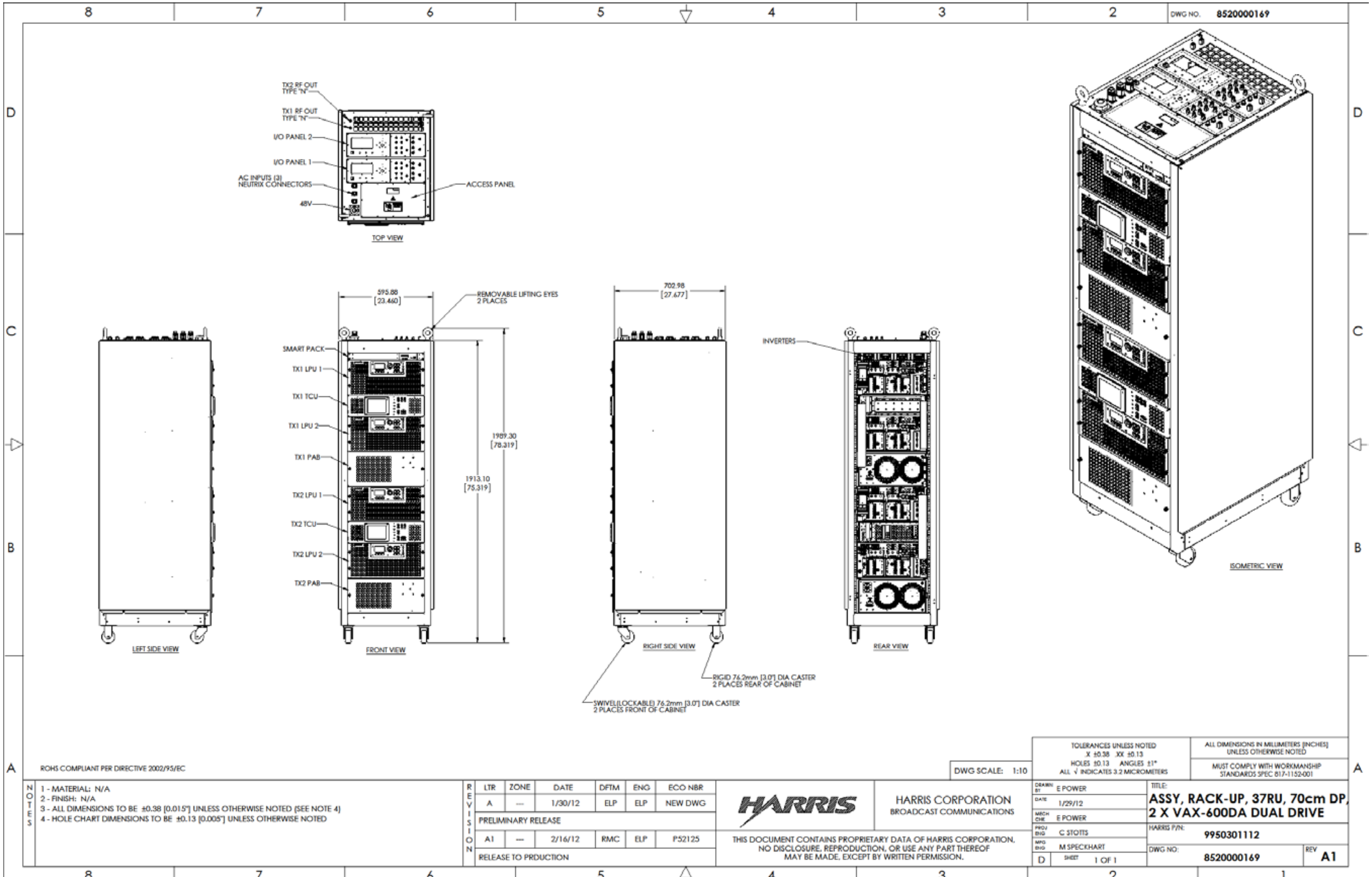
843-5610-167 Wiring Diagram 198-250VAC, 3-Ph Delta AC Distribution, 1250-2500W



4 of 4

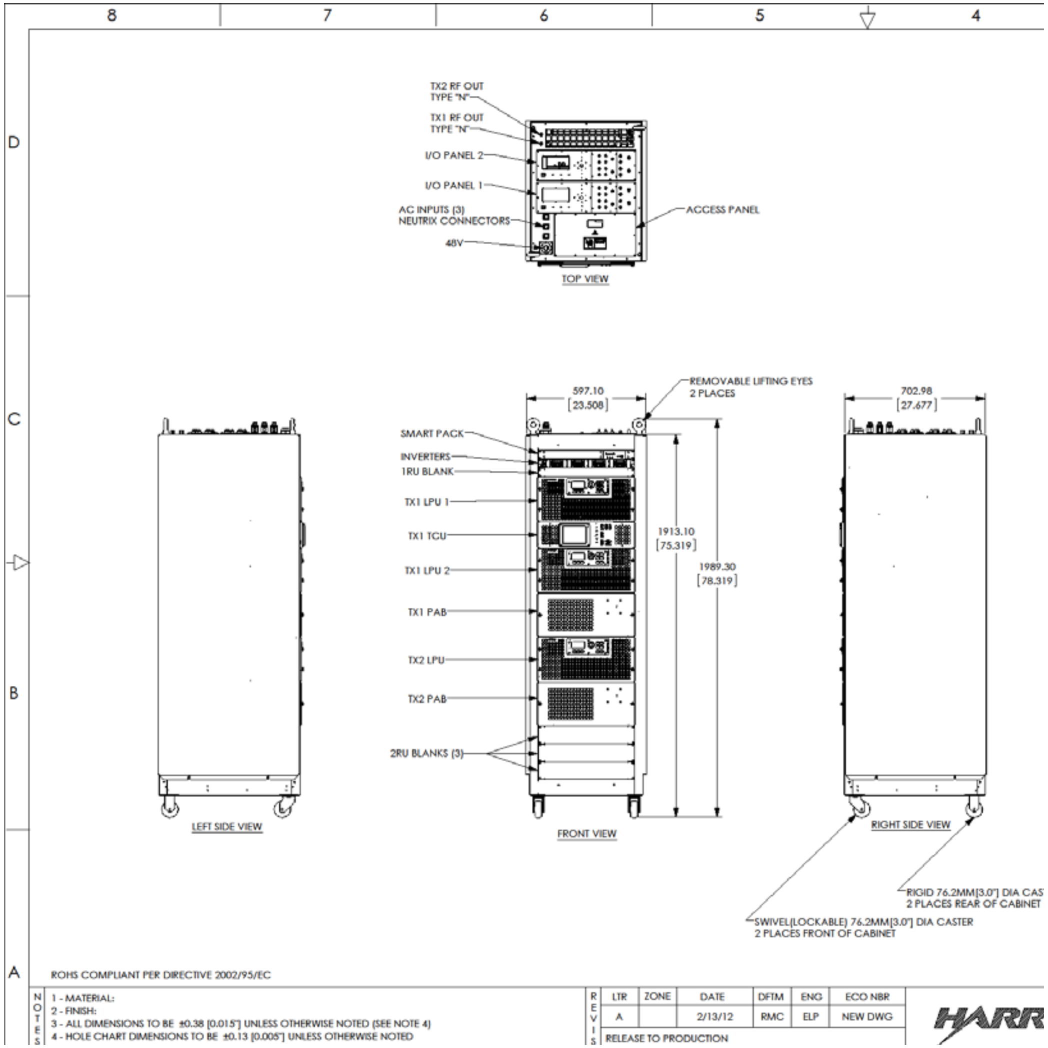

242100.304
I/O Monitor 1
CON202'
Ext. Alarm I/O Connections
CON303"
Ext. Alarm I/O Connections
CON301'
Ext. Alarm I/O Connections
CAN port
CAN port
To Inverter T2S
Inputs from Cabinet Top
Smartpack Assembly
TB1
Ground stud
7930121000
Rear connections
Smartpack monitoring and control unit
Front connections
CON5
System Connections
CON4
Battery connections
CON2
Ext. Alarm I/O Connections
CON1
Alarm I/O Connections
Ethernet port
CAN port
CAN port
USB
System Connection Board
The Harris manufactured cable package for the Smartpack assembly is part number 9810090171.
Can Bus Terminator (120 Ohm resistor between pins 1+2) Part Number 7930122000
B C1 10-FEB-12 RJP RJP P52066
Removed Inverter DC Connections
A N/A 23-JAN-12 RJP RJP P51935
New Drawing
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R Proske
23-Jan-2012
R Proske
R-Proske
B Olson
SmartPack Assembly, Norkring
9810090170
8435610170
REV B

853-0000-169 ASSY, Rack-Up, 37RU, 70 cm DP, 2X FAX-600DA, Dual Drive, Dual Drive

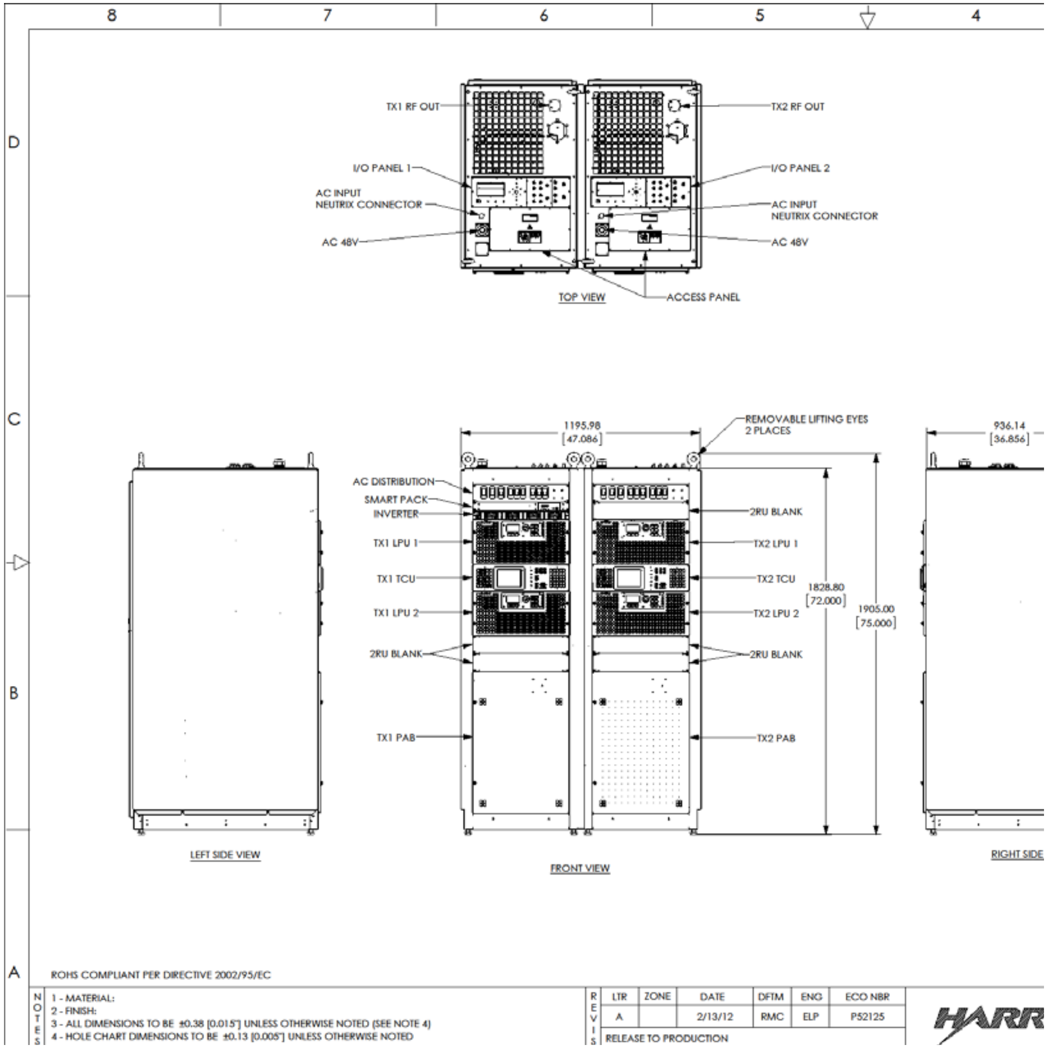


1 of 1

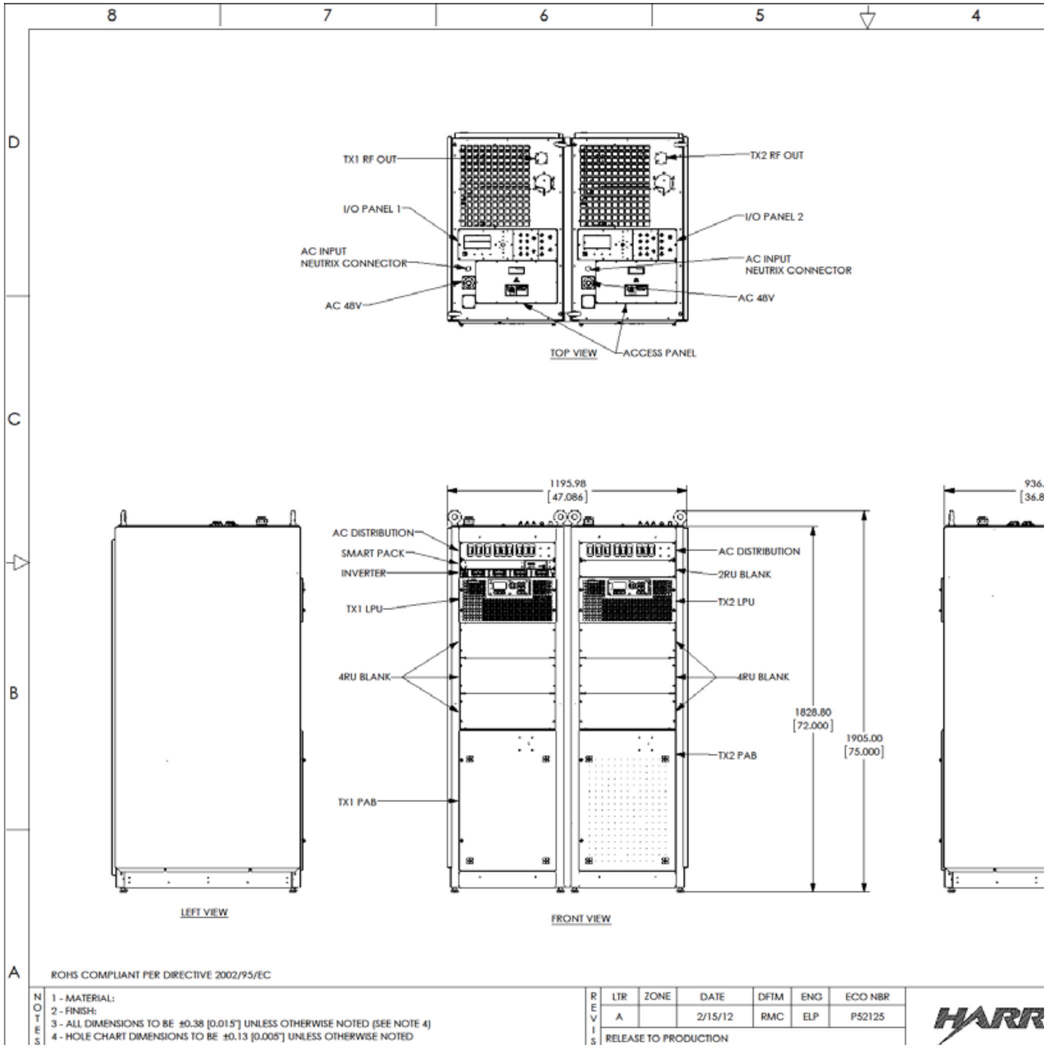
853-0000-170 ASSY, Rack-Up, 37RU, 70cm DP, 2X FAX-600DA, Dual Drive, Single Drive



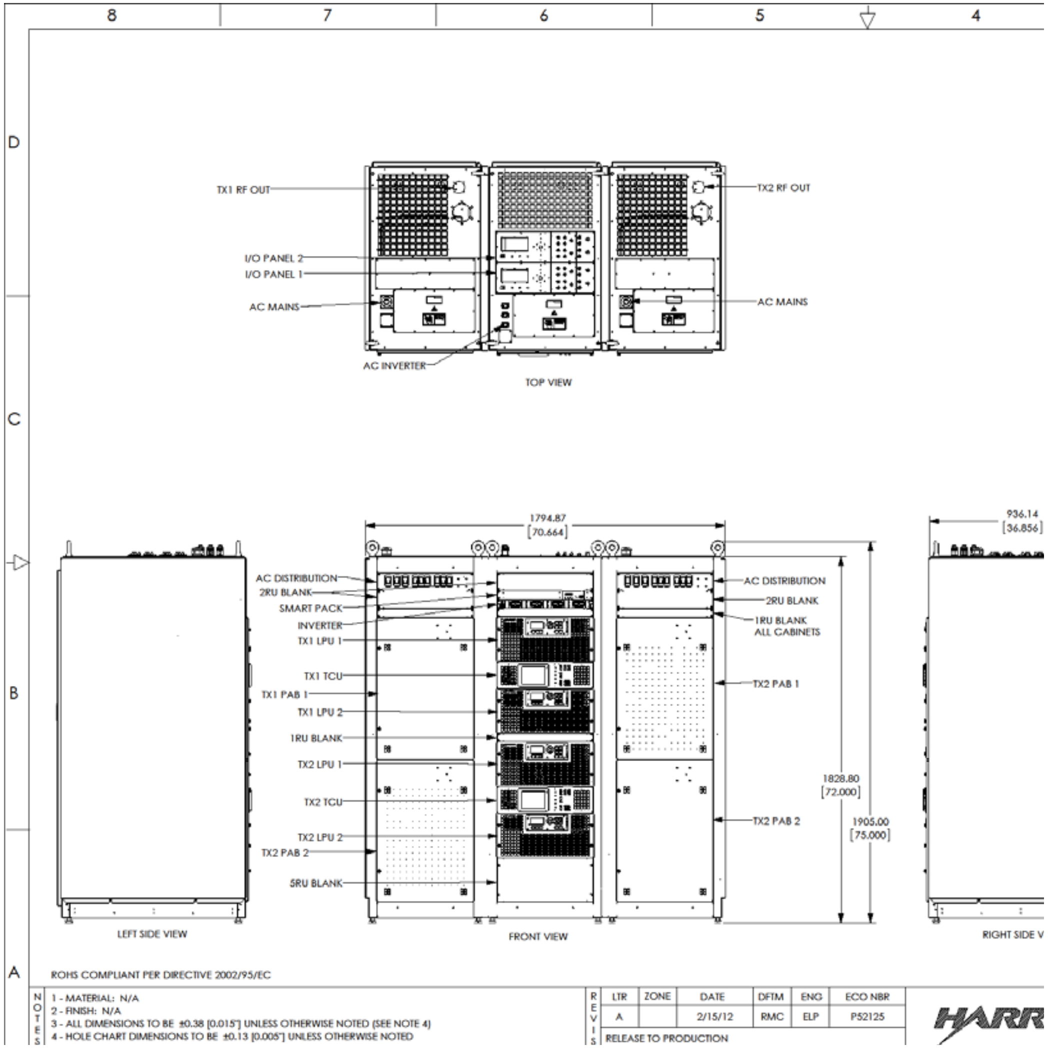
888-0000-171 ASSY, Rack-Up, 37RU, VAX-1250DA, Dual Drive, Dual Drive



888-0000-172 ASSY, VAX-1250DA, Single Drive, Single Drive



888-0000-173 Layout, VAX-5000DA, Dual Drive, Dual Drive



TCU = TRANSMITTER CONTROL UNIT

- TCU contains GUI (graphical user interface panel PC).
- Battery for real time clock on PCM card. Must be installed on site. (CR1025, DC1025 Lithium 3V, 10mm)
- Transmitter stays on air if TCU fails or is removed.
- TCU *cards are not hot swappable.* Remove power from TCU before removing cards.



TCU used with dual LPUs

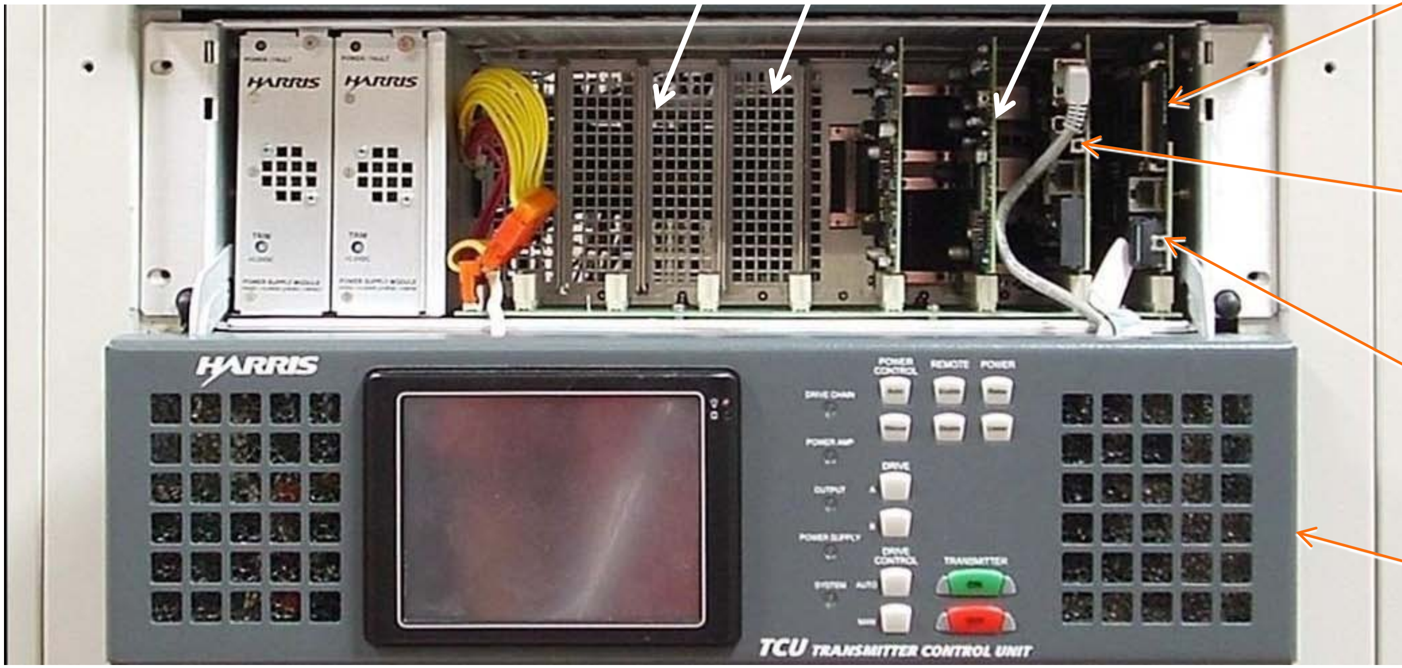
TCU = Transmitter Control Unit



GUI screen calibration can be accessed during reboot. Tap screen when "Touch screen to calibrate." text appears. 5 point cal begins.

Reboot of TCU takes about 2 minutes. Transmitter will stay on air if reset button on PCM or MCM card is used.

TCU = Transmitter Control Unit



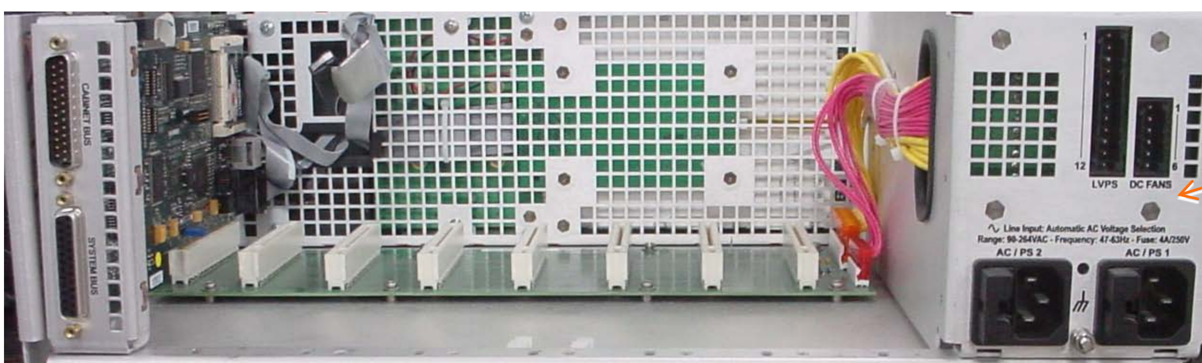
Flash Card
(2GB,FAT 16 Format use Sandisk Ultra II)

PCM Reset

MCM Reset

Holes for handles

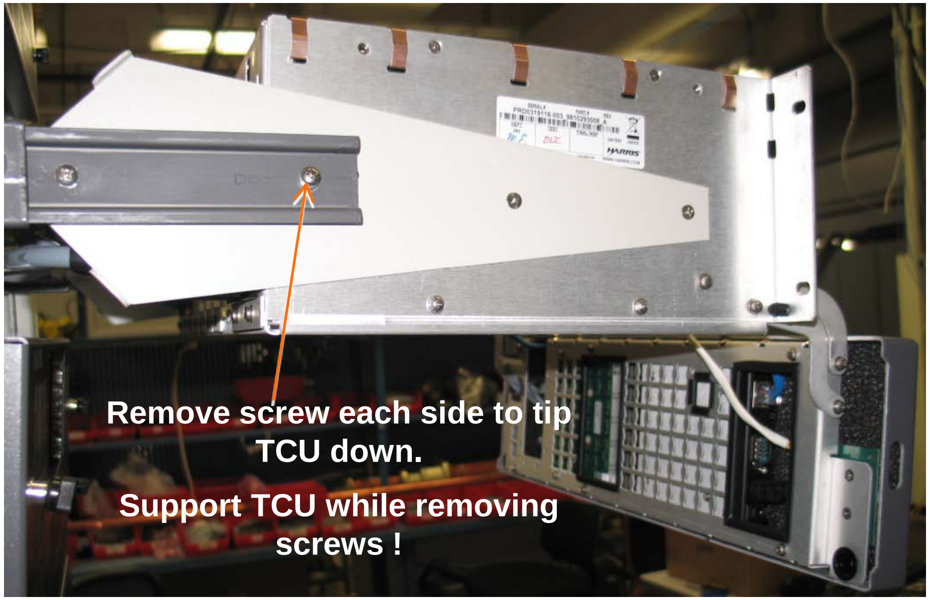
TCU front panel, pulled forward and down



TCU Rear
No On/Off switch.

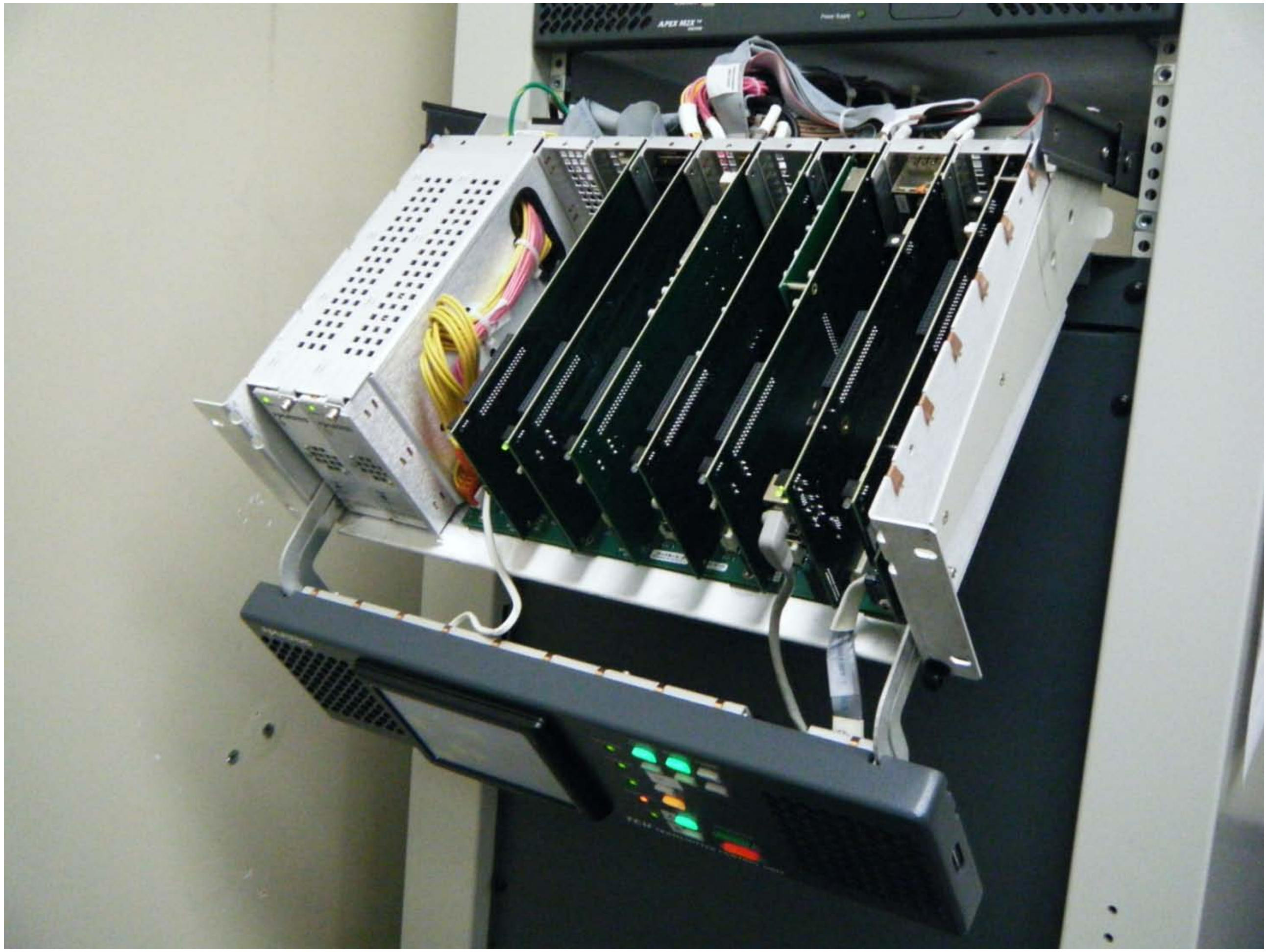
TCU = Transmitter Control Unit





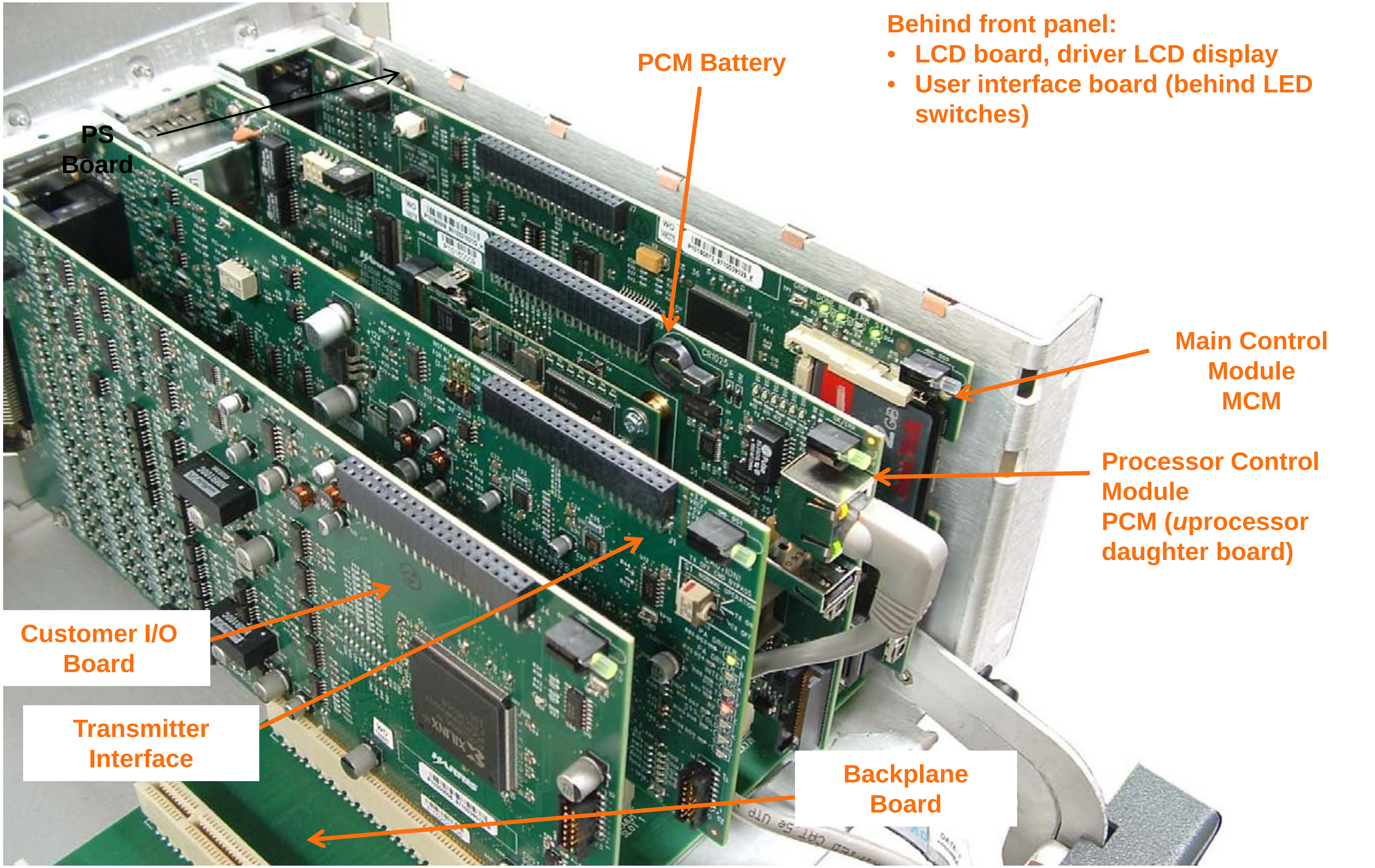
- TCU – Pulled our of rack, cover removed.
- Cards can be removed after power down.
- One screw at rear holds cards in chassis.
- Cards lift up out of chassis.

TCU = Transmitter Control Unit



TCU – Pulled out from rack and pivoted downward

TCU COMPONENTS



TCU - CARDS

- **Master Control Module (MCM) –** Responsible for transmitter and TCU board control.
- **Processor Control Module (PCM) –** Enhanced customer interface, web page server, SMP info to remote users.
- **Customer I/O -** Provides for all customer parallel interfaces connections on I/O panel at top of
- **TX Interface –** Interfaces to several subsystems for dual LPUs, RF switch, system interlock.
- **PS 1 & 2 -** Redundant 24V power supplies. Produce supply voltage for boards in TCU.

TCU – HARDWARE BUTTONS



- *Power Control Auto/Manual* **: Automatic power level control activated. The transmitter RF output power is held to the level established by the FWD PWR REF setting. Manual: The power level can be manually raised or lower using the Power Raise or Lower buttons.**

- *Remote Enable/Disable:* **Enables or disables remote control of the transmitter. Enable: The transmitter system can be remotely controlled by either the user parallel interface or the remote web interface. Disable: The transmitter will only respond to local commands issued from the various front panel controls.**

- *Power Raise/Lower:* **Pressing raise will increase RF power output. Lower decreases power output. *Caution: There may be a slight lag in system power level response time. Holding buttons in may cause undesired overshoots.***

- *Drive (LPU) A/B:* **Selects which LPU is connected to the high power amplifier stages and ultimately the antenna or system load. The non-selected (reserve) LPU is connected to a small RF dummy load.**

- *Drive Control Auto/Manual Auto:* **Automatic LPU switchover is enabled. The system will select the reserve LPU in the event of the failure of the main LPU. Manual: Automatic LPU switchover is disabled. The system will not automatically select the reserve LPU in the event of the failure of the main LPU.**

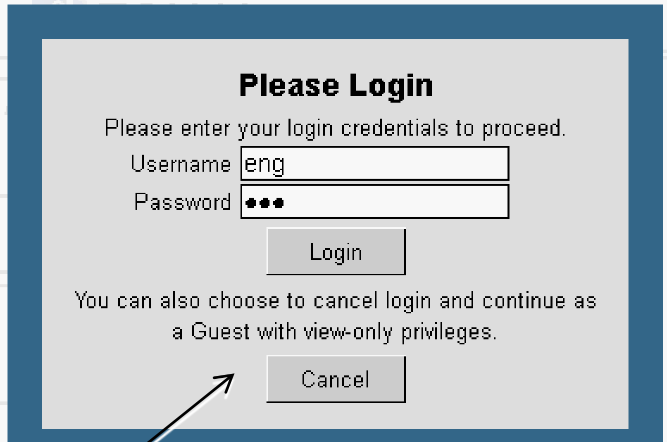
- *Transmitter ON/OFF:* **Switches transmitter RF output on or off. Built-in switch LEDs provide feedback as to ON/OFF status of transmitter system. ON button is lit green when transmitter system is switched on. OFF button is lit red when transmitter system is switched off.**

Set or find IP address in Service>Netwrk screen

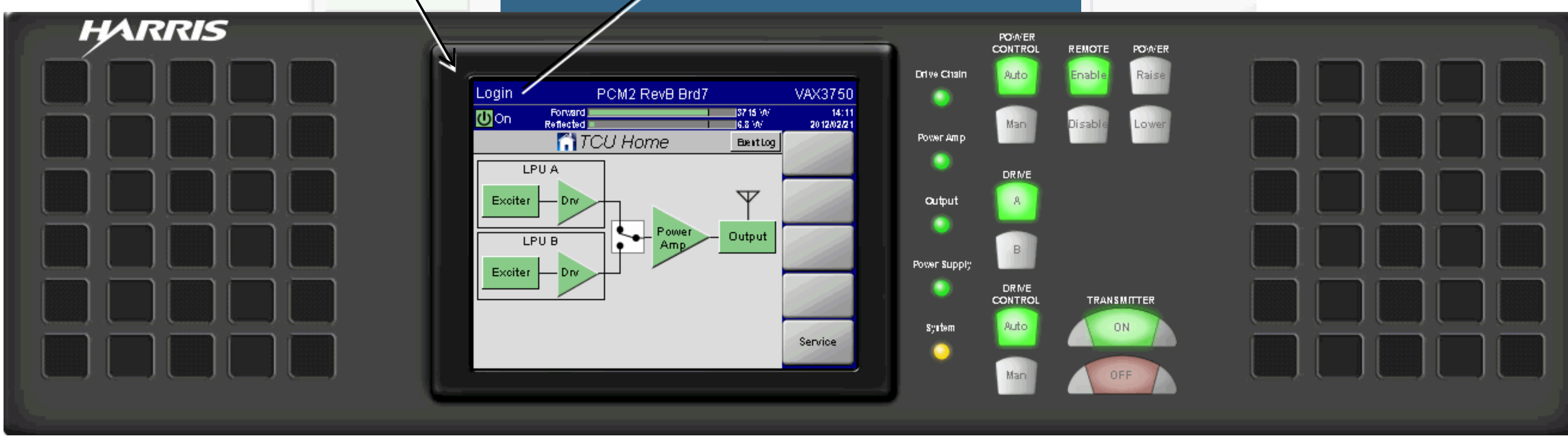
Connect to IP address - using Mozilla Firefox for best results. IE 8 & Chrome should work too.

Login not required to view screens.

Panel PC display runs LINUX.



See next page for information on setting up usernames and passwords.

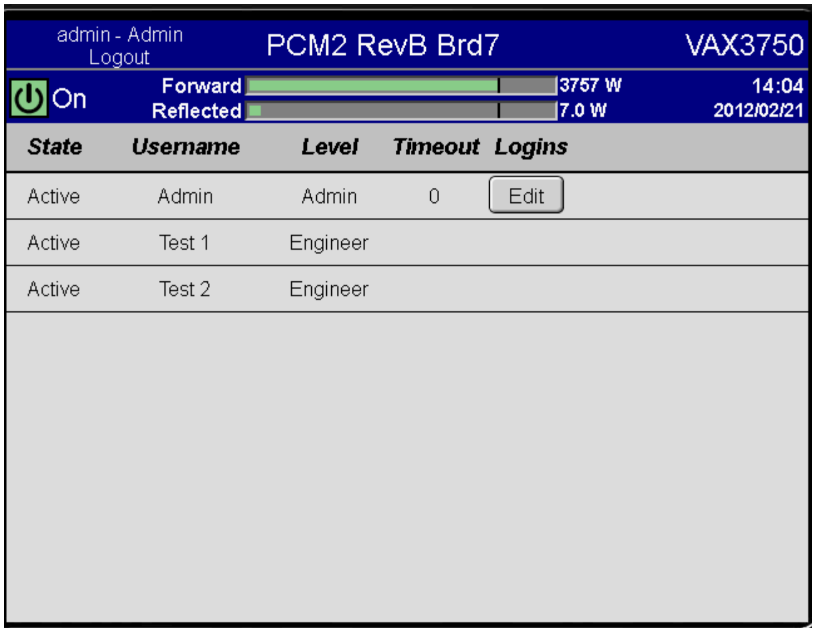


TCU controls LPU switching and TX system in dual LPU systems.

TCU Admin Log

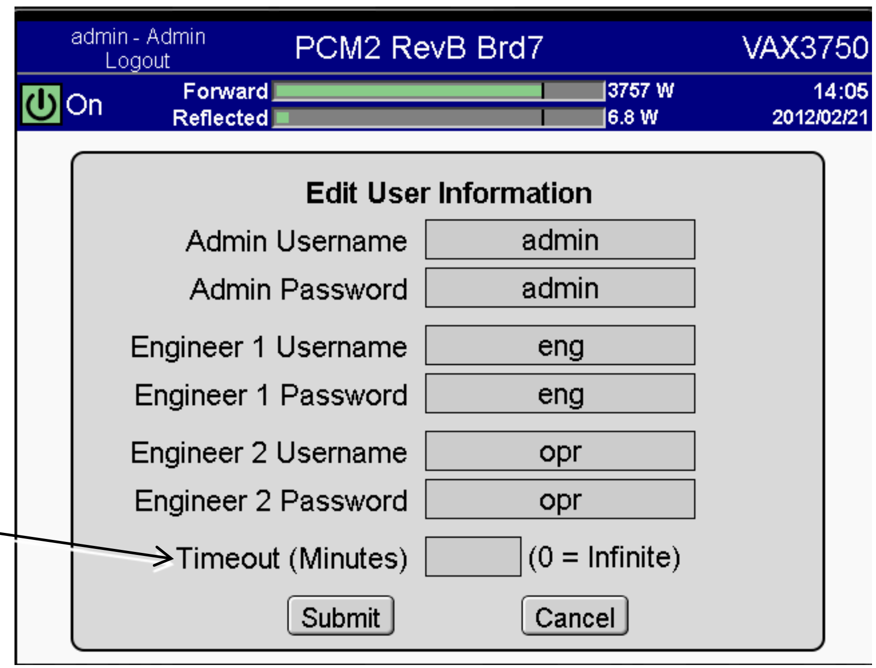
Username = admin (default)

Password = admin (default)



First-time - login as Administrator locally using default admin username and password.

Then reset admin username and password and engineer level username and passwords.

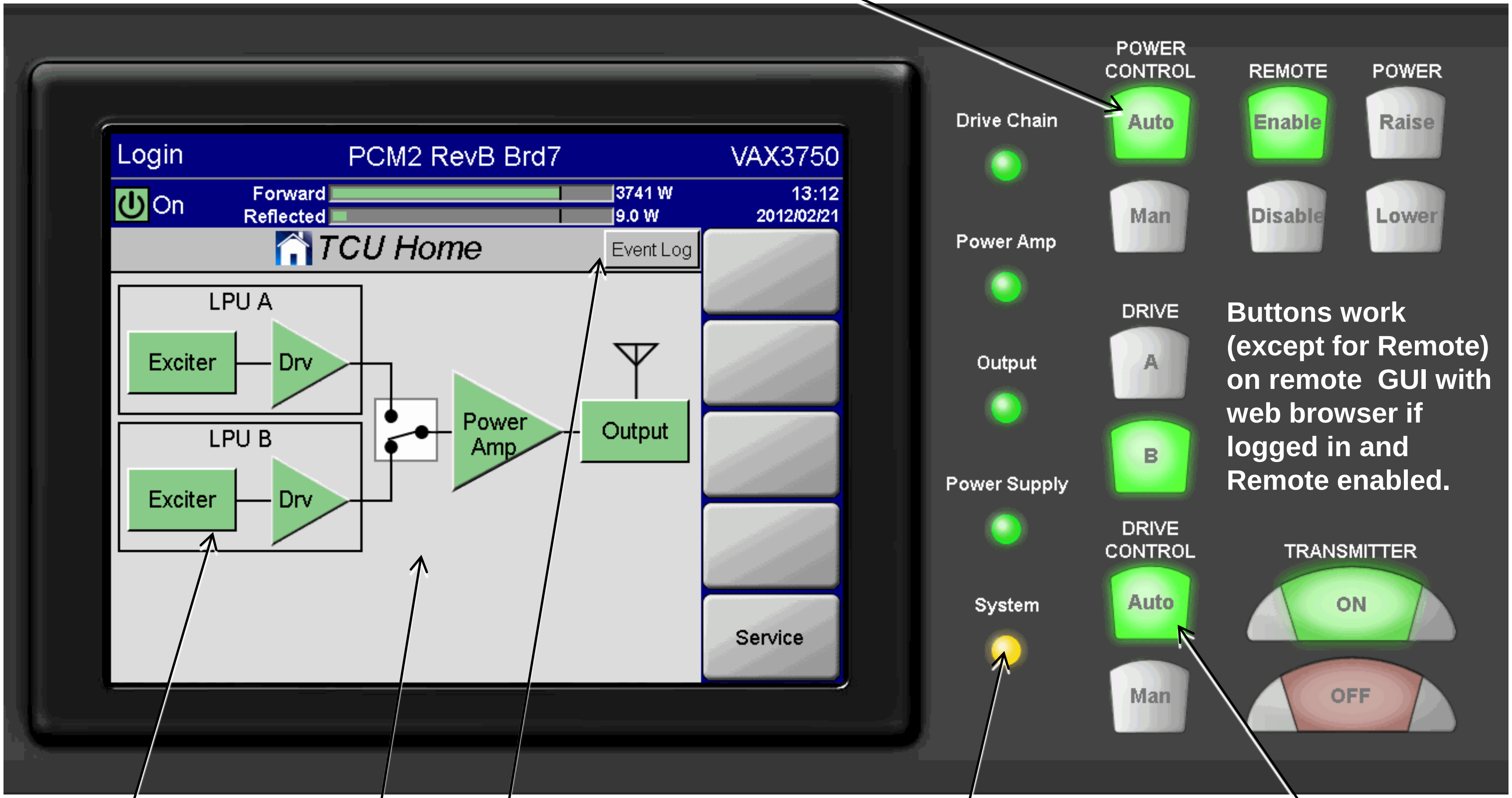


Login timeout settable on Admin Edit screen.

TCU HOME SCREEN & FRONT PANEL BUTTONS

TCU and LPU will have 1 Admin, 1 Eng, 1 Operator, & multiple Guest levels Logins.

Auto is normal. Man disables ALC.



Buttons work (except for Remote) on remote GUI with web browser if logged in and Remote enabled.

Active LPU

GUI Panel PC

Yellow LED indicates missing RTAC sample in this case. Need to check active LPU for warnings and errors. Not always listed in TCU event log.

Auto can't be selected with a bad LPU.

TCU event log. Go to active LPU for more detailed fault log info.

TCU HOME SCREEN, EVENT LOG, & SYSTEM SERVICE

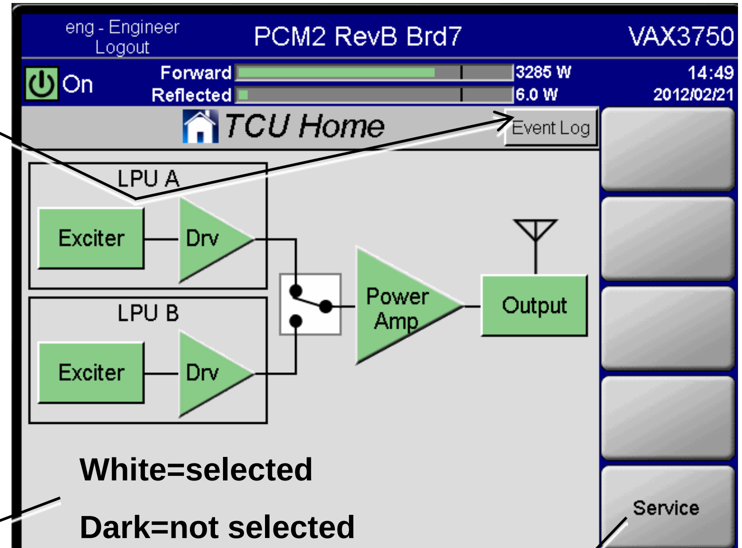
There can be up to 1,000 faults stored in the TCU Event Log, after which, faults are deleted on a FIFO (First In First Out) basis.

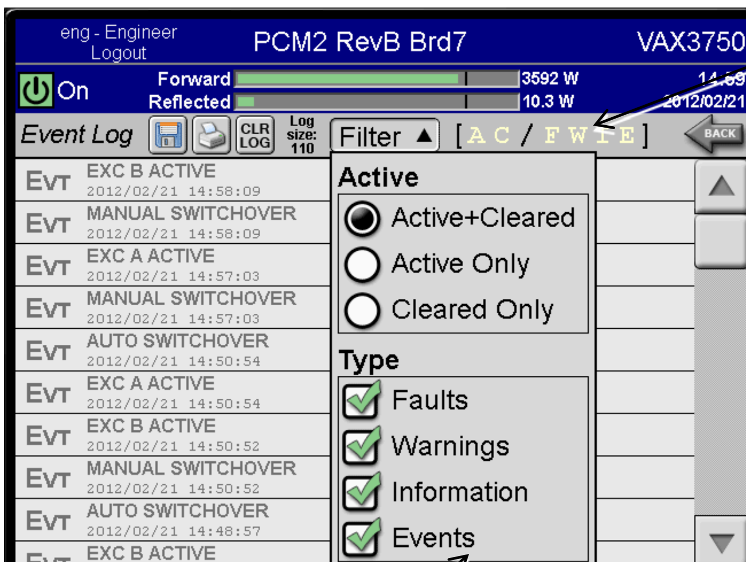
The TCU event log can be printed or saved by double clicking on the diskette or printer icons.

Time is in 24 hr. format (HH/MM).

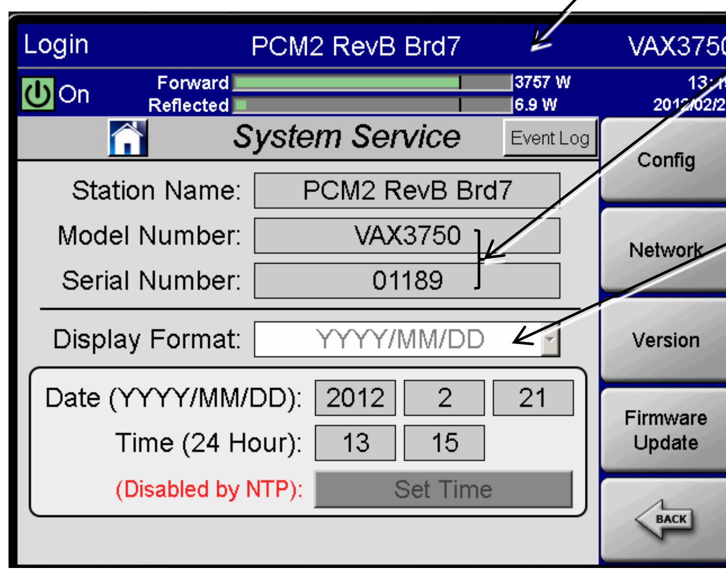
Active faults red. Active warnings yellow.

Inactive items are gray background.





Selectable filtering



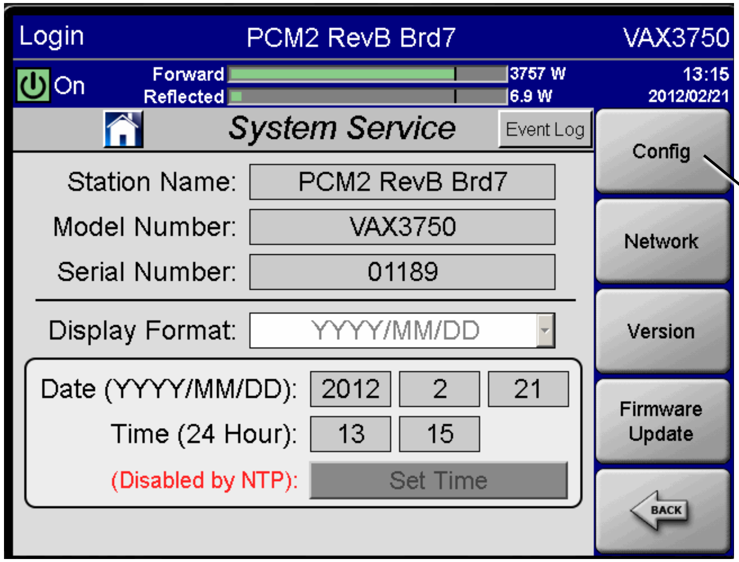
1x set up at factory

MM/DD/YY

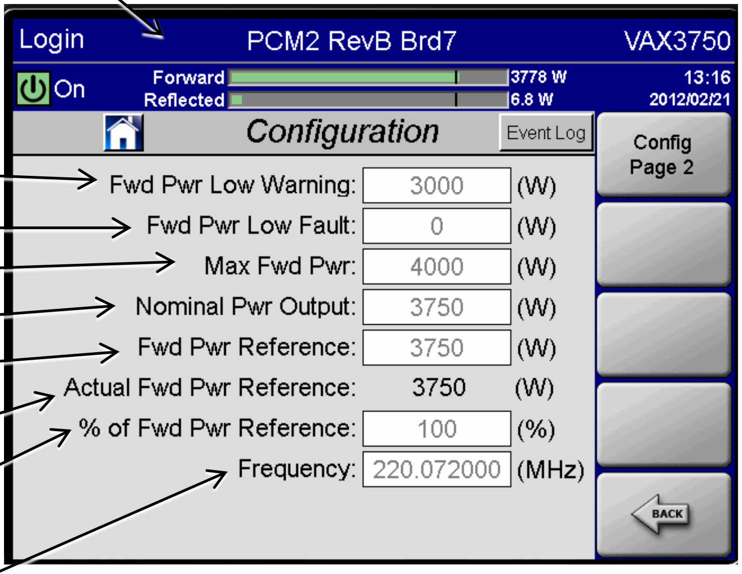
DD/MM/YYYY

YYYY/MM/DD

TCU SCREENS SYSTEM SERVICE, CONFIGURATION



These Config settings go out to LPU's.



Low power output warning level – yellow bar. 80% typ.

Low power output fault level – red bar.

High power output fault – red bar

Sets 100% power output level on bar

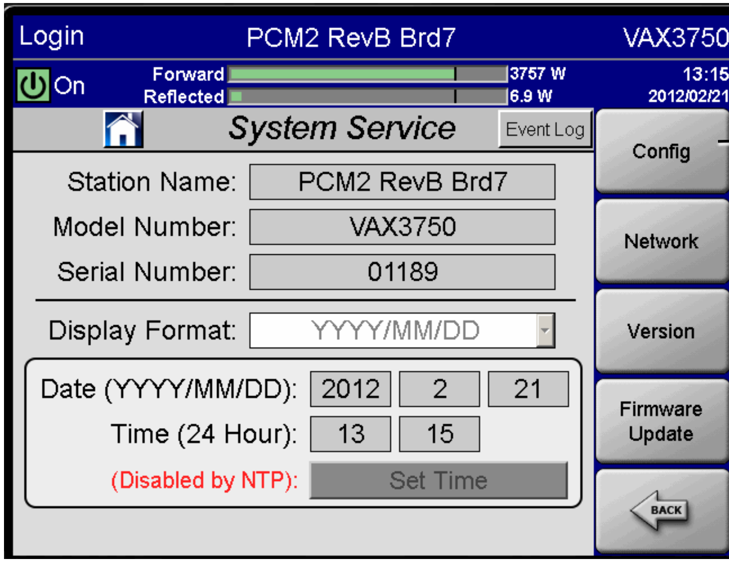
Set desired TPO (W) here.

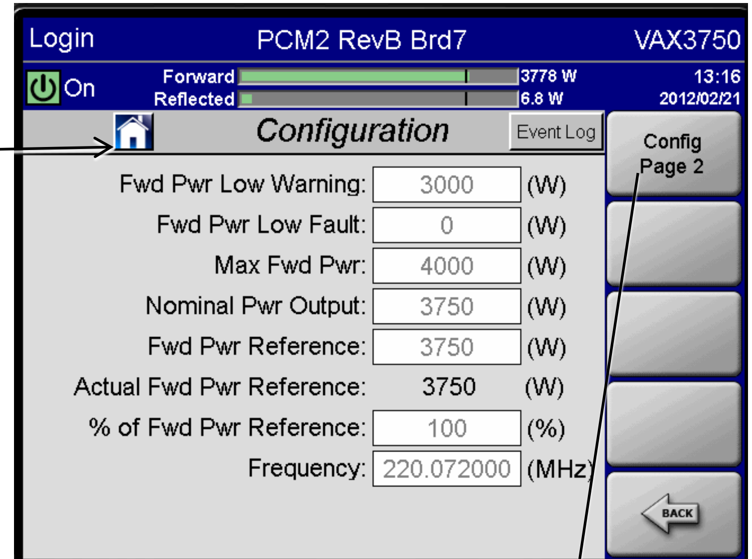
Power setting in active LPU. May be lower than Fwd Power Ref. if bad module or in foldback.

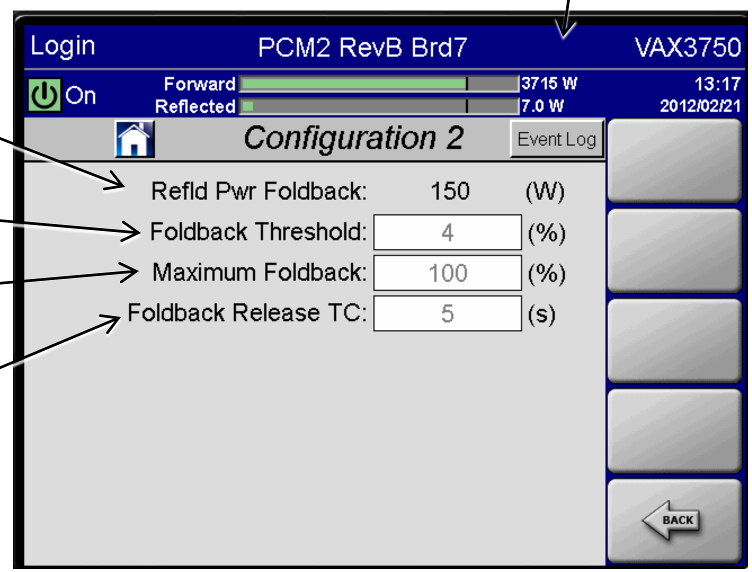
Set desired TPO % here (0-100%). Limited by Nominal Power Out

Frequency in MHz. Sets both LPU's.

TCU SCREENS SYSTEM SERVICE, CONFIGURATION







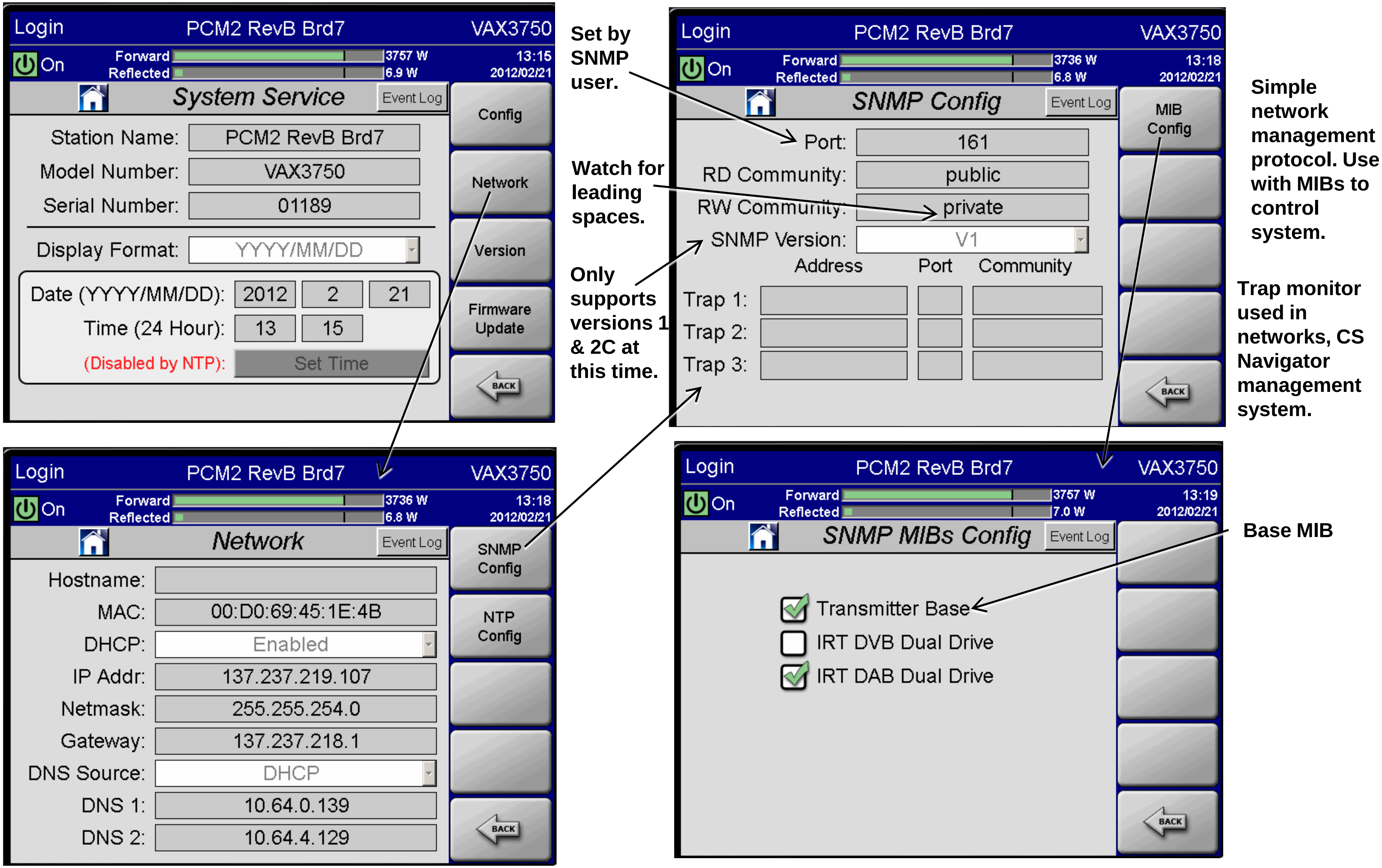
Reflected power level that initiates foldback in Watts.

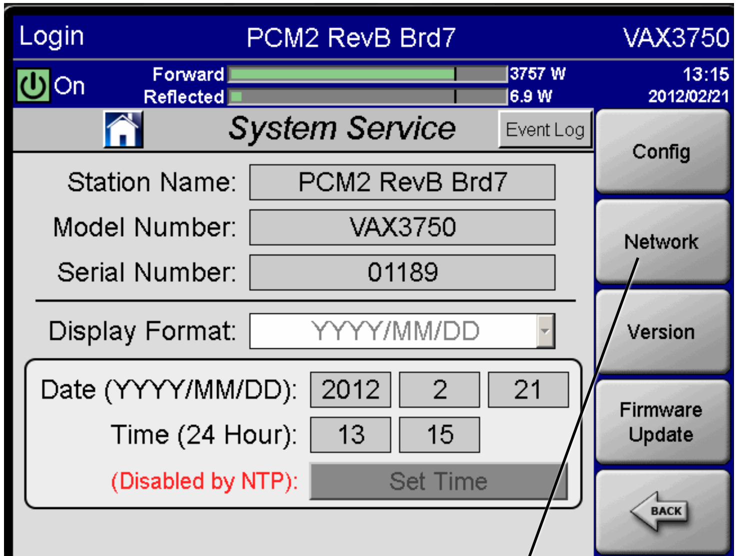
Reflected power that initiates foldback (1-4%). 4% is around 1.5:1 VSWR

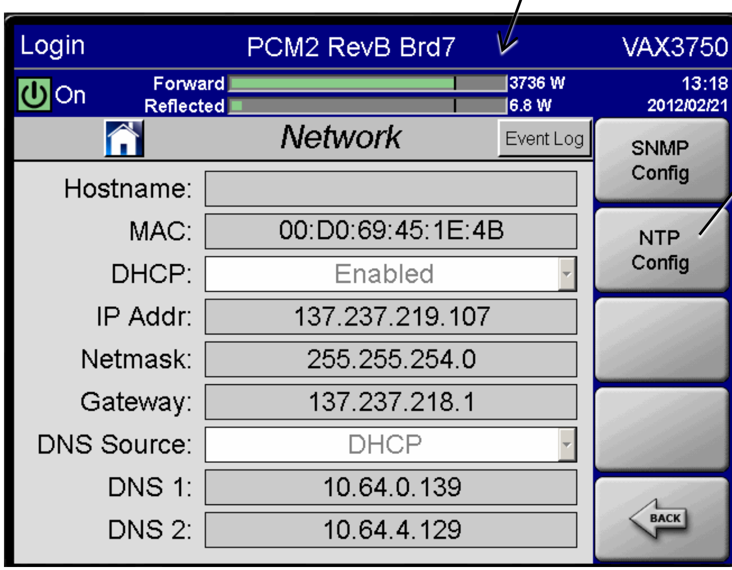
How far will Tx foldback 50-100%. 100% foldback = zero watts output

How long Tx stays in foldback 5 - 120 seconds. Tries to increase power in 20% increments.

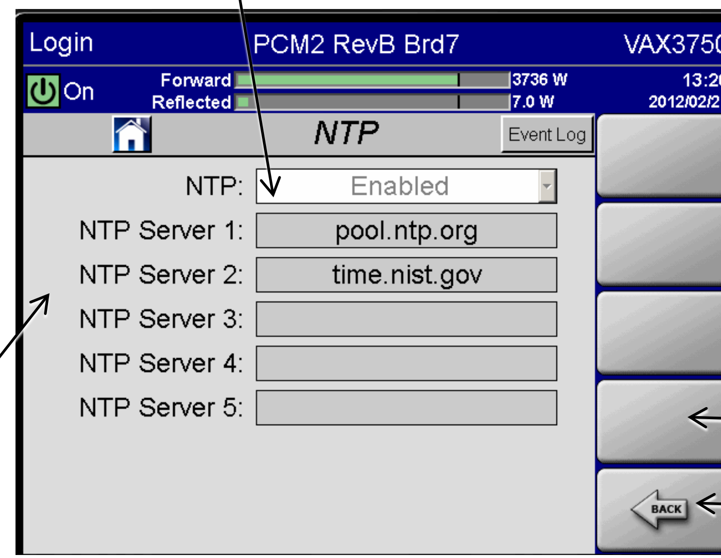
TCU SCREENS SYSTEM SERVICE, NETWORK, SNMP







NTP *Disabled* allows manual time and date changes on System Service screen.



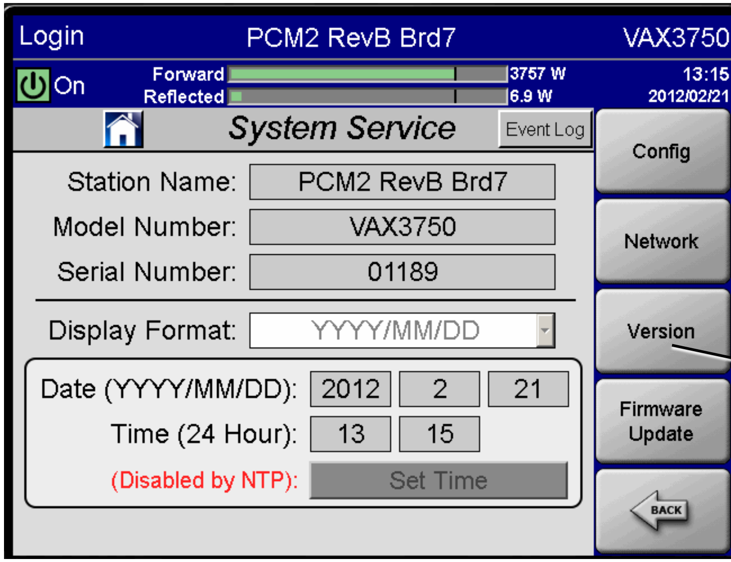
Press *Save* after making changes. Or Cancel.

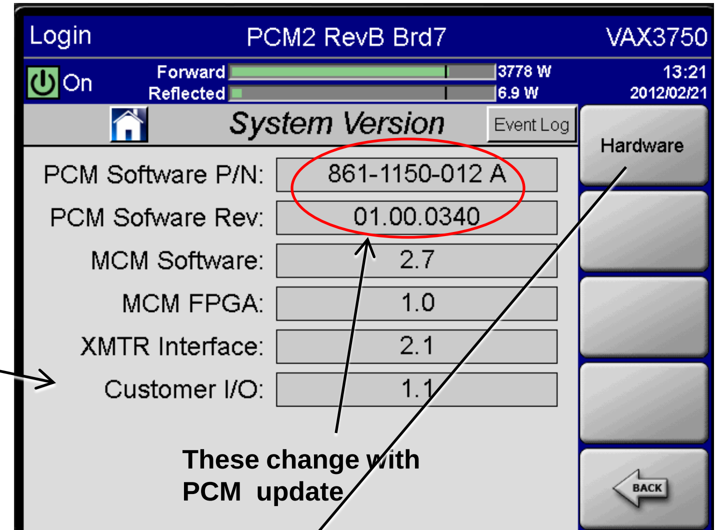
Save

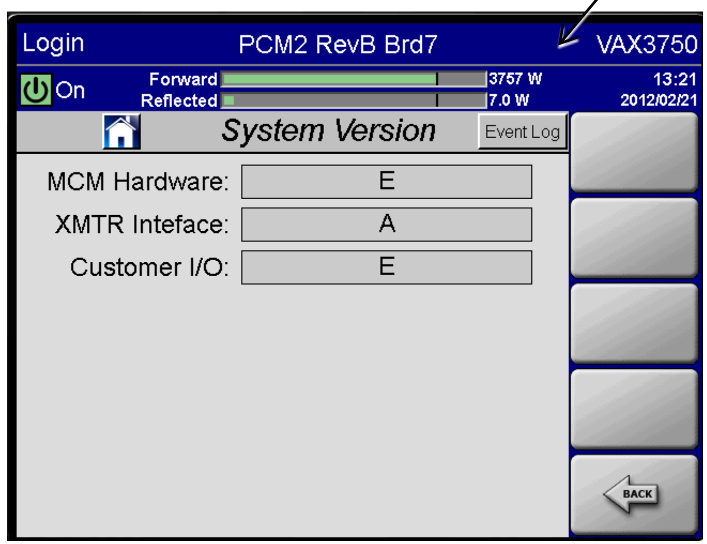
Cancel

Network time protocol. Time references from network locations.

LPU takes only one NTP address.

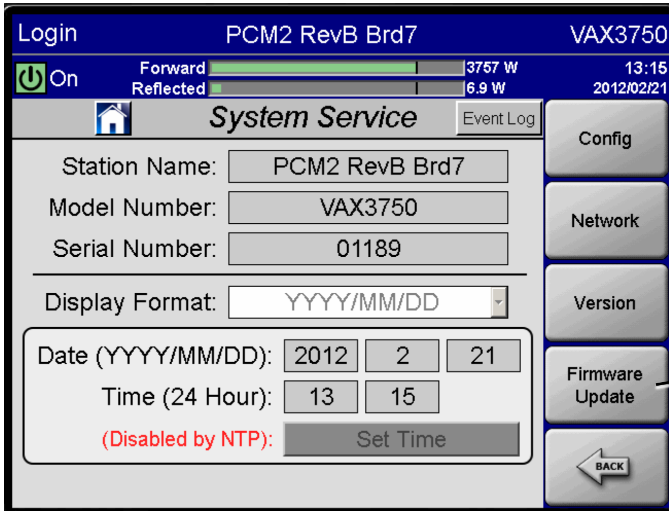


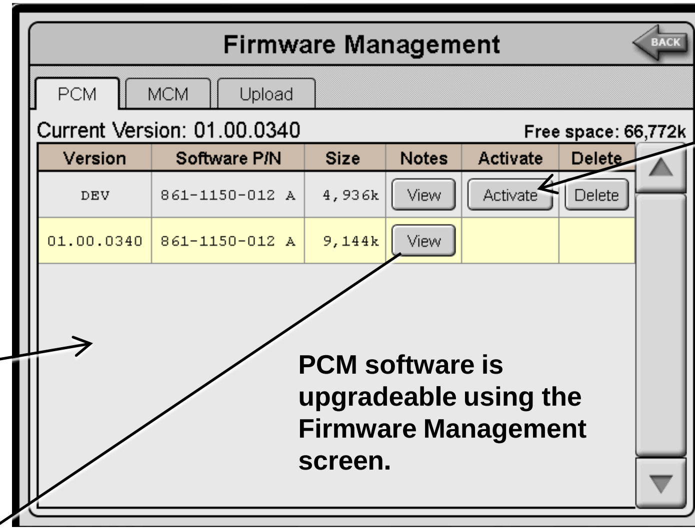




Refer to these screens when working with Harris field service.

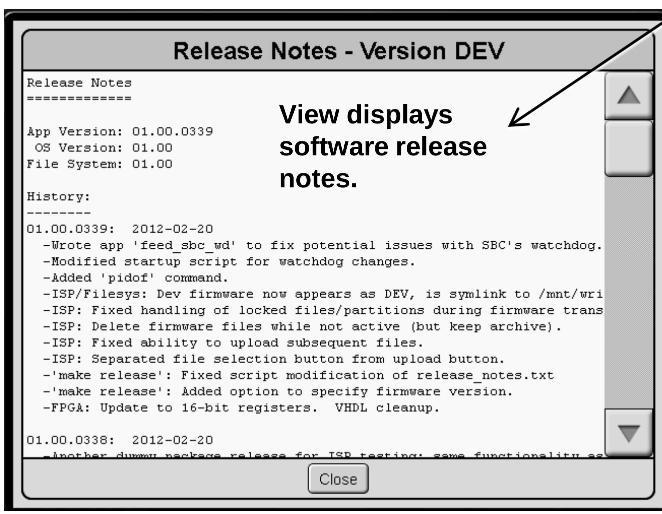
TCU FIRMWARE UPDATE



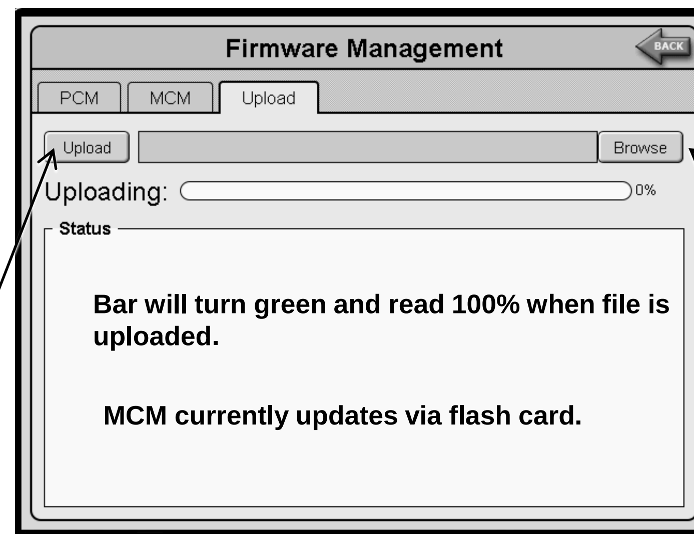


PCM software is upgradeable using the Firmware Management screen.

Press Activate to update PCM…or press Delete to remove the file.



View displays software release notes.



Bar will turn green and read 100% when file is uploaded.

MCM currently updates via flash card.

Browse for .tcu filename and select.

Press Upload button to upload file to TCU.

TCU SOFTWARE COMPONENTS

861-1142-012 UAX/VAX SW, Customer I_O (JTAG, XYLINX programmer needed)

861-1142-022 UAX/VAX SW, UCP, Main Control Module (.ace file on flash card, must rename old file extension .old)

861-1150-012 S/W,TCU,PCM II,PPC,UAX / VAX, Process Control Module (.tcu file used in Firmware Update)

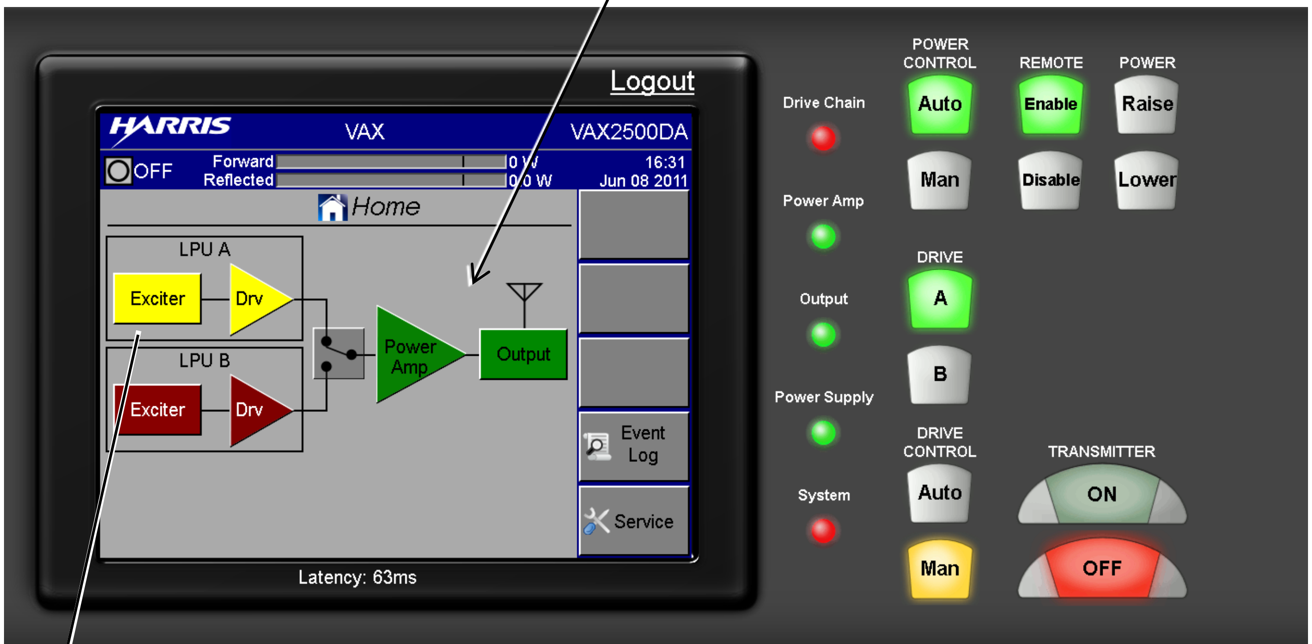
861-1142-142 UAX/VAX SW, UCP, TCU Interface (JTAG, XYLINX programmer needed)

861-1142-052 SW, UCP, UAX/VAX Panel PC (LINUX and flash card in panel pc, use hook to remove and replace flash card. Flash card is specially formatted and acts as hard drive for panel PC.)

Note: The PCM software is currently the only TCU software upgradeable via Firmware Update screen in web GUI. MCM may also be upgradeable via Firmware Update screen in the future.

LPU SCREENS

TCU Home screen Tx OFF. Exciter A selected.

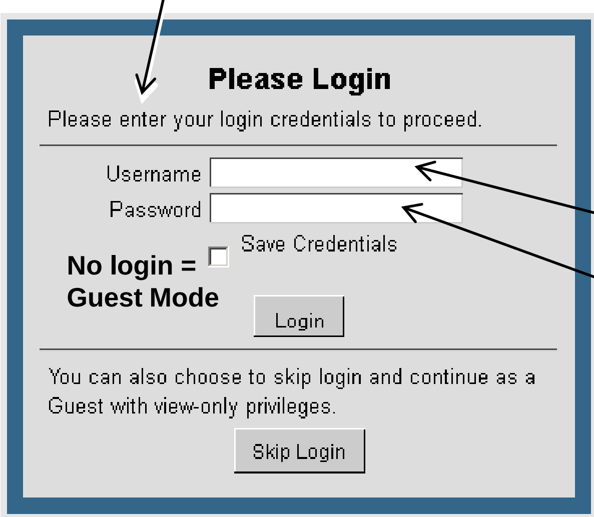


TCU IP: port#

B= 848 port

A= 592 port

Allows direct web interface with LPUs.



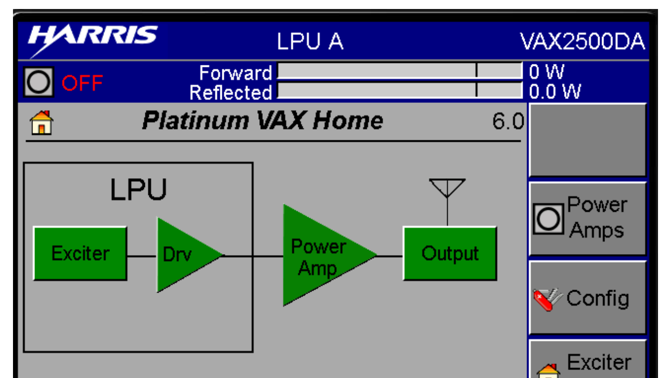
No login = Guest Mode

Pressing the exciter button on LPUA opens the LPU log in screen.

Username = admin

Password = admin

These are setup on the LPU using NetAdmin.

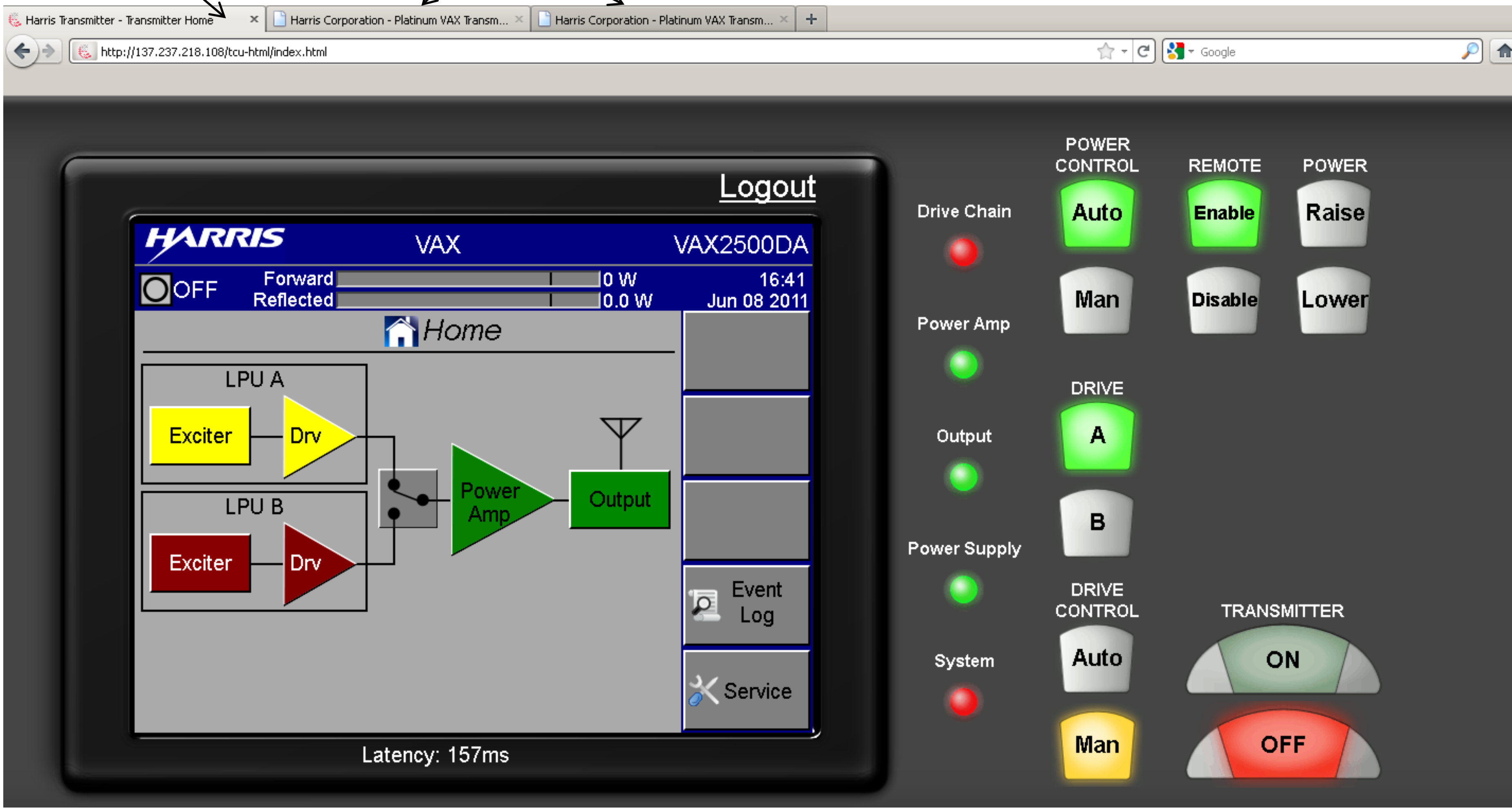


VAX Home screen opens after log-in.

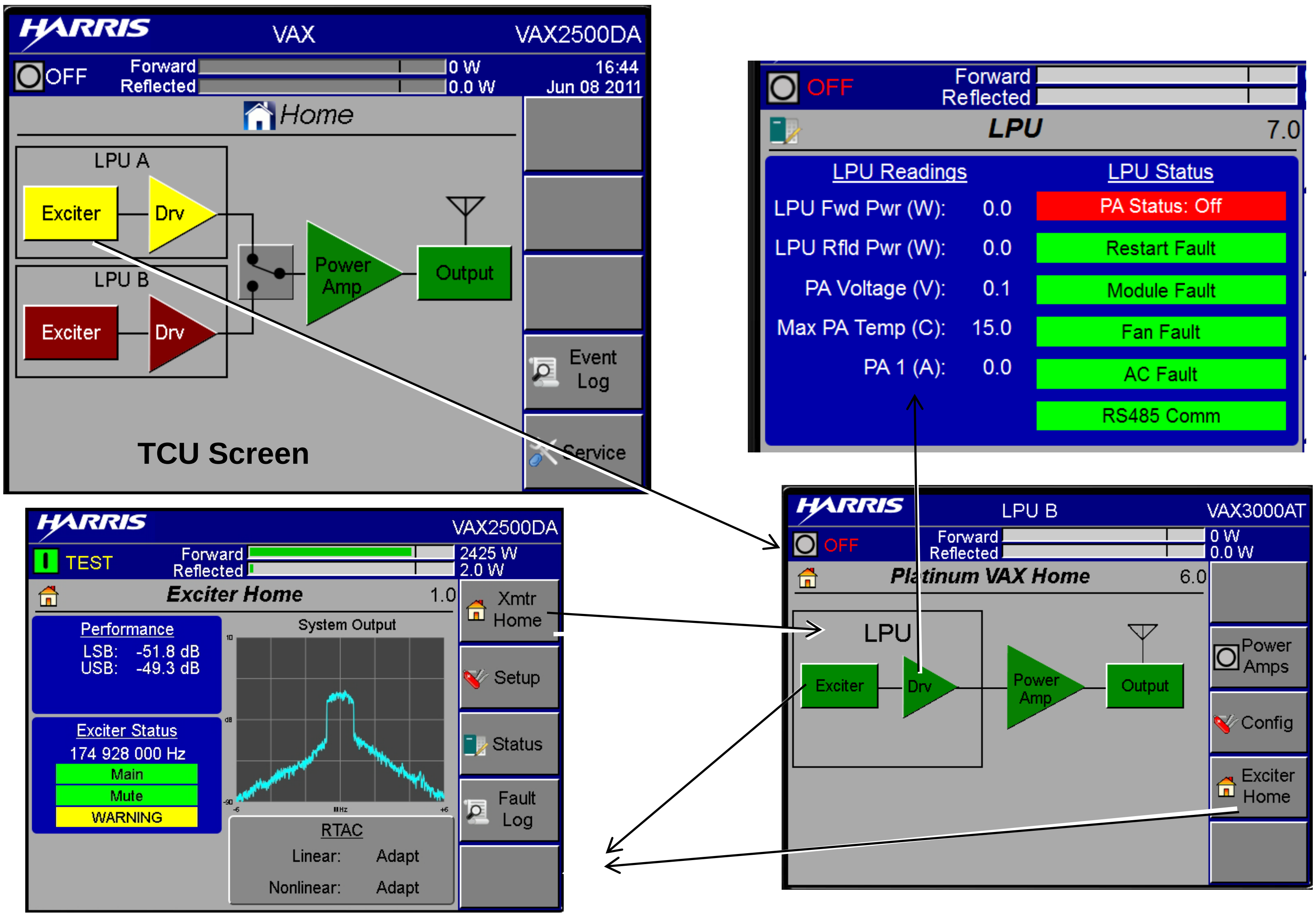
TCU tab

LPU tabs

Firefox browser allows multiple tabs.

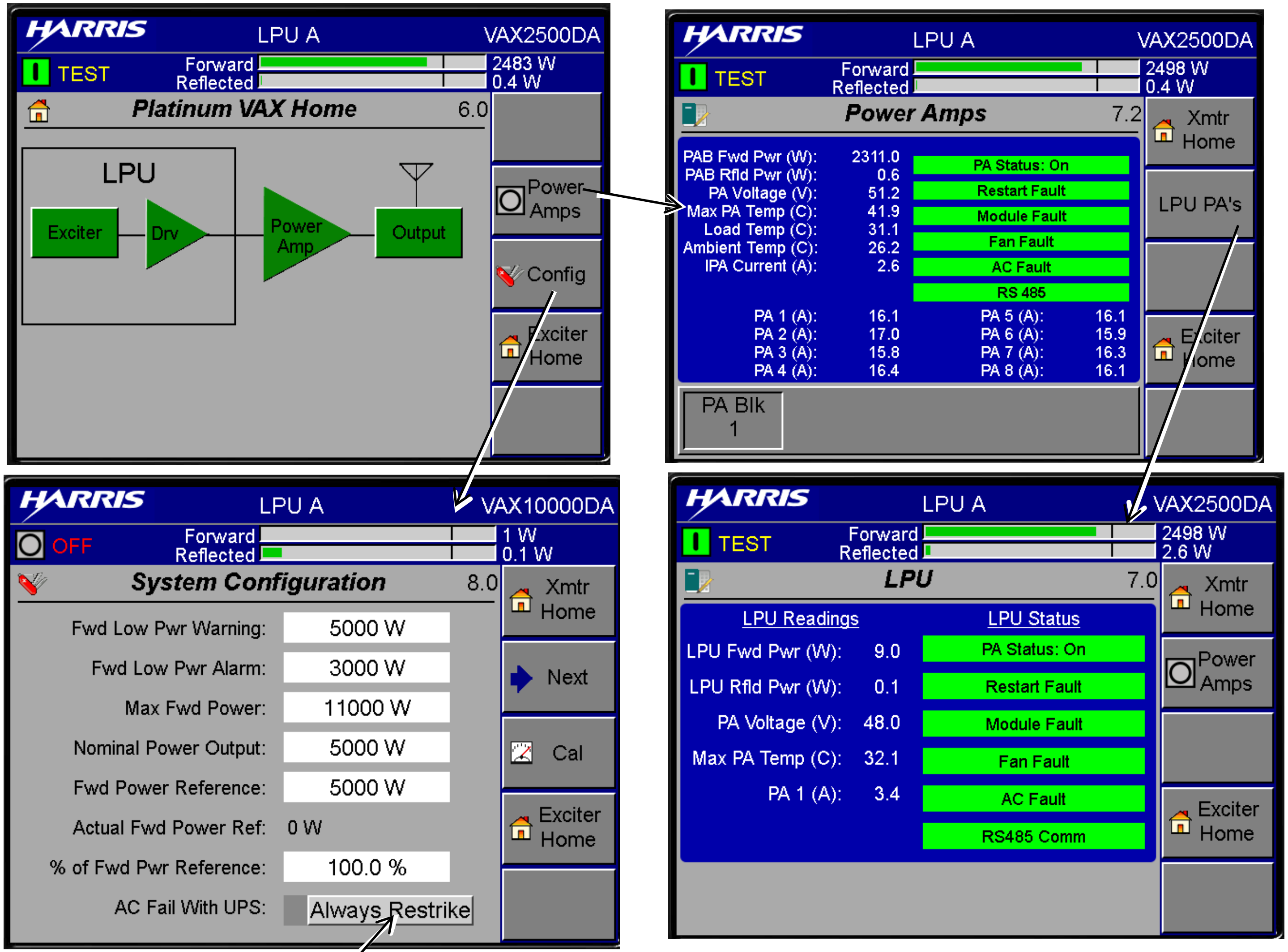


LPU SCREENS



HARRIS
VAX
VAX2500DA
OFF
Forward
Reflected
0 W
0.0 W
16:44
Jun 08 2011
Home
LPU A
Exciter
Drv
LPU B
Exciter
Drv
Power Amp
Output
Event Log
Service
TCU Screen
OFF
Forward
Reflected
LPU
7.0
LPU Readings
LPU Status
LPU Fwd Pwr (W): 0.0
LPU Rfld Pwr (W): 0.0
PA Voltage (V): 0.1
Max PA Temp (C): 15.0
PA 1 (A): 0.0
PA Status: Off
Restart Fault
Module Fault
Fan Fault
AC Fault
RS485 Comm
HARRIS
VAX2500DA
TEST
Forward
Reflected
2425 W
2.0 W
Exciter Home
1.0
Xmtr Home
Performance
LSB: -51.8 dB
USB: -49.3 dB
System Output
Exciter Status
174 928 000 Hz
Main
Mute
WARNING
Setup
Status
Fault Log
RTAC
Linear: Adapt
Nonlinear: Adapt
HARRIS
LPU B
VAX3000AT
OFF
Forward
Reflected
0 W
0.0 W
Platinum VAX Home
6.0
LPU
Exciter
Drv
Power Amp
Output
Power Amps
Config
Exciter Home

LPU SCREENS



PA module current is sum of both pallets.

IPA pallet currents display alternately every few seconds.

All fans in PAB run at single speed.

LPU rear fan can be changed while on-air (change assy.)

PAB fans can be changed while on-air (change full door assy.)

PA module temp max is 125ºC. Warning at 115ºC.

Typical is 65ºC.

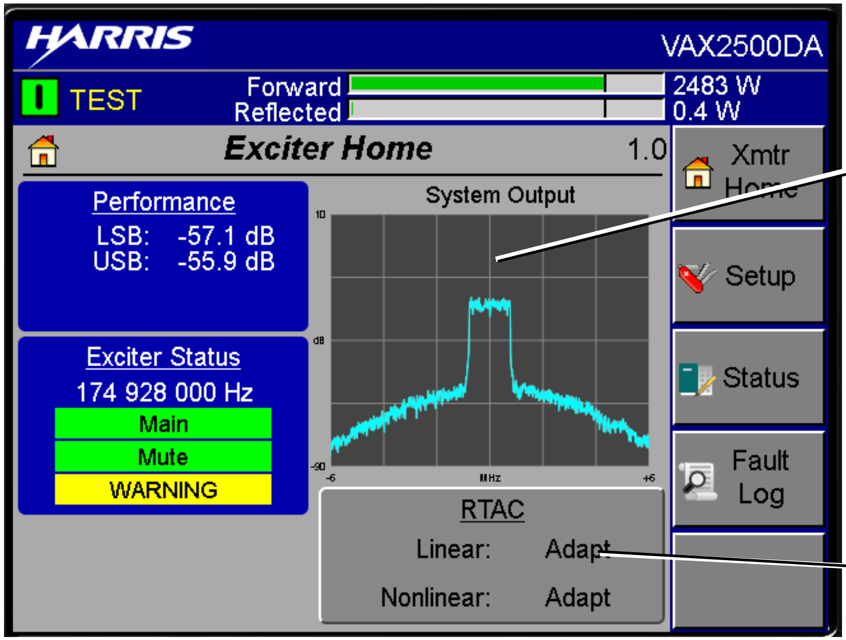
100ºC is max load temp. (combiner)

No ambient temp trip point.

With UPS set to Always Restrike. Otherwise either Always Restrike or 3-Strike Off.

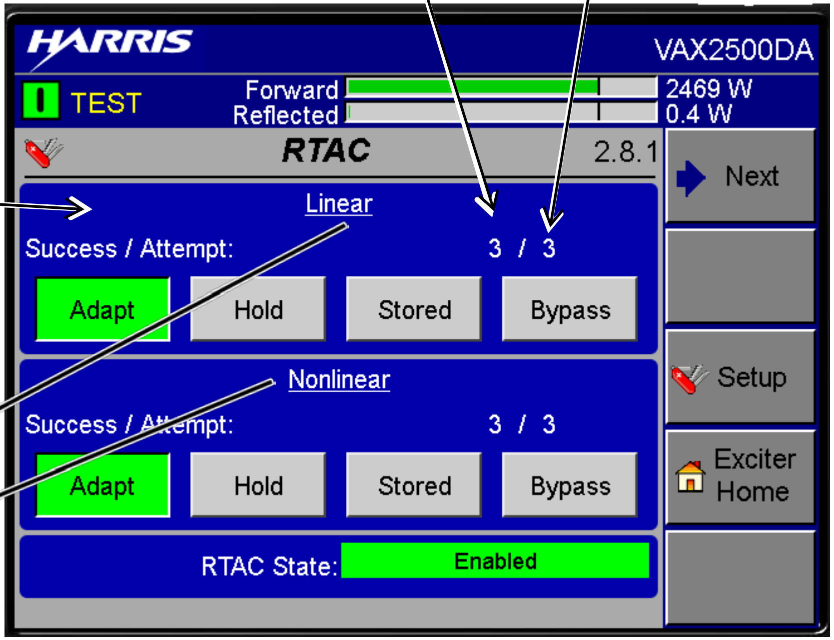
3-Strike Off has 15 second window.

LPU EXCITER HOME AND RTAC SCREENS



Post RTAC output after mask filter. Signal doesn't immediately disappear if signal is lost.

Successes **Attempts**



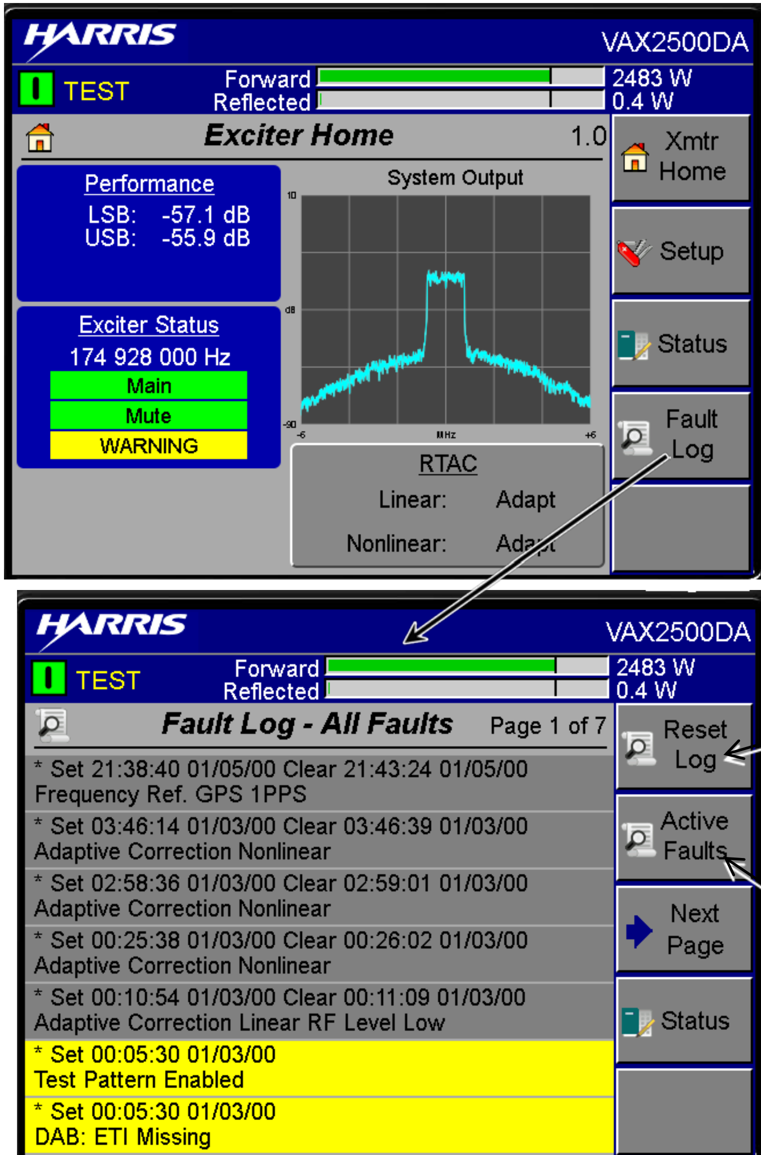
Pressing the RTAC box on the Exciter Home page opens the RTAC control screen.

Linear corrects for distortions in filter.

Nonlinear corrects for distortions in amplifier.

RTAC State Disabled:
inactive / man AGC mode / Calibration / Tx-Off / Tx-on, but failed to ramp up to actual Power level

LPU EXCITER HOME AND FAULT LOG SCREENS



Pressing the Fault Log button opens Fault Log-All Faults screen.

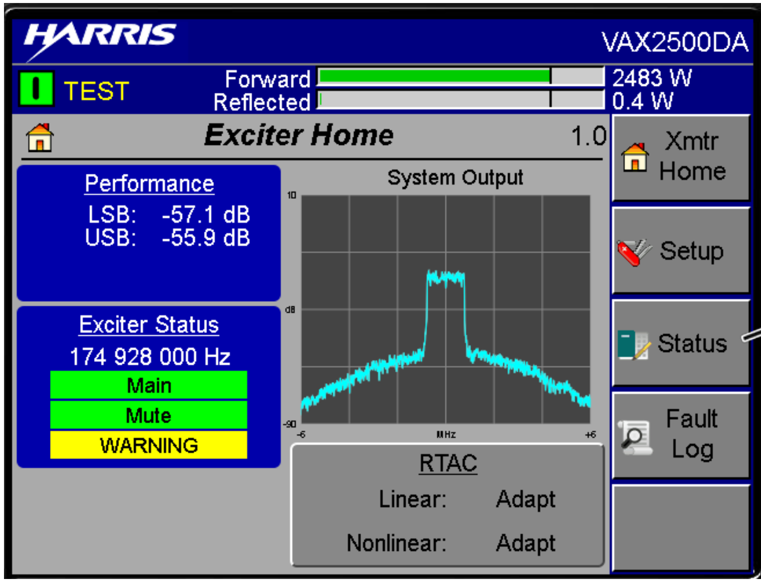
The LPU fault log stores up to 500 entries, after which, faults are deleted on a FIFO basis. The last fifty faults can be viewed in the LPU fault log

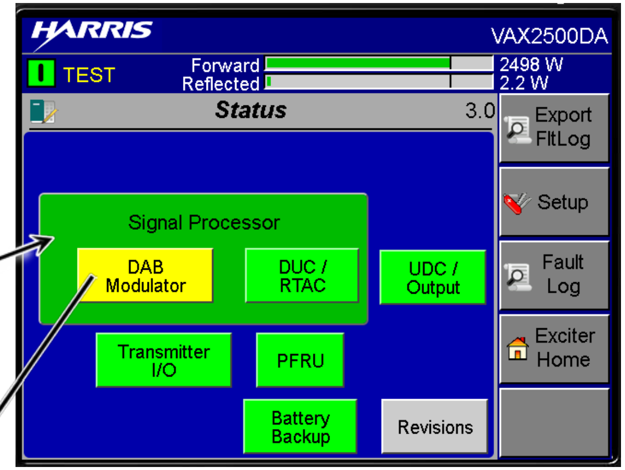
Go to Status screen to find Export FltLog button. All stored entries can be exported here.

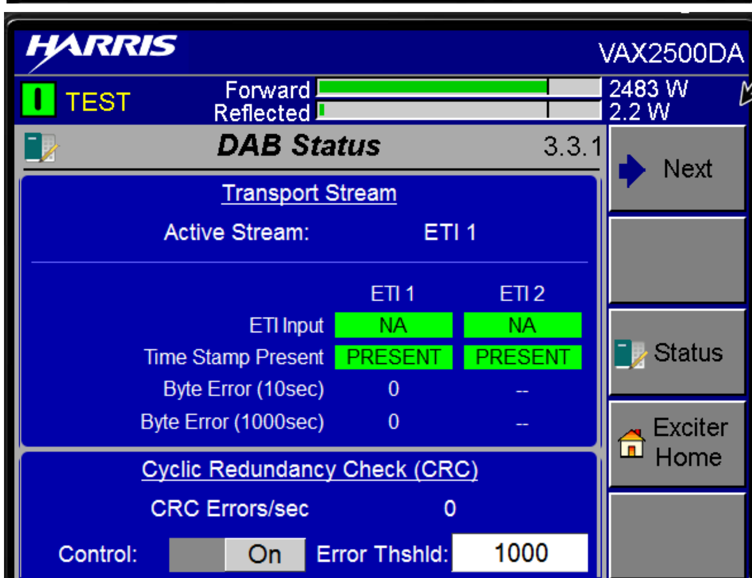
Erases all log entries. Active faults will come back.

Displays only active faults. All faults will return if pressed again.

LPU STATUS PAGES





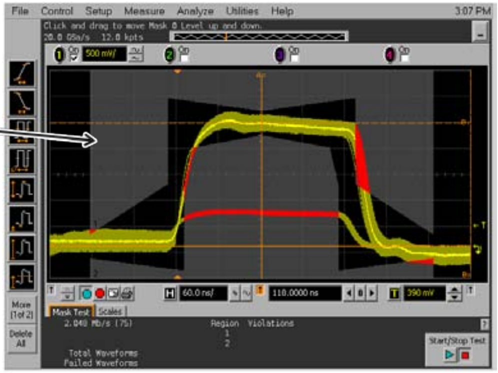


Behavior in case of Input Signal Level Compression

-11 dB:
ETI recognized correctly, no Byte Errors, no CRC errors

-12 db:
ETI still recognized correctly, but Byte Errors present, no CRC errors

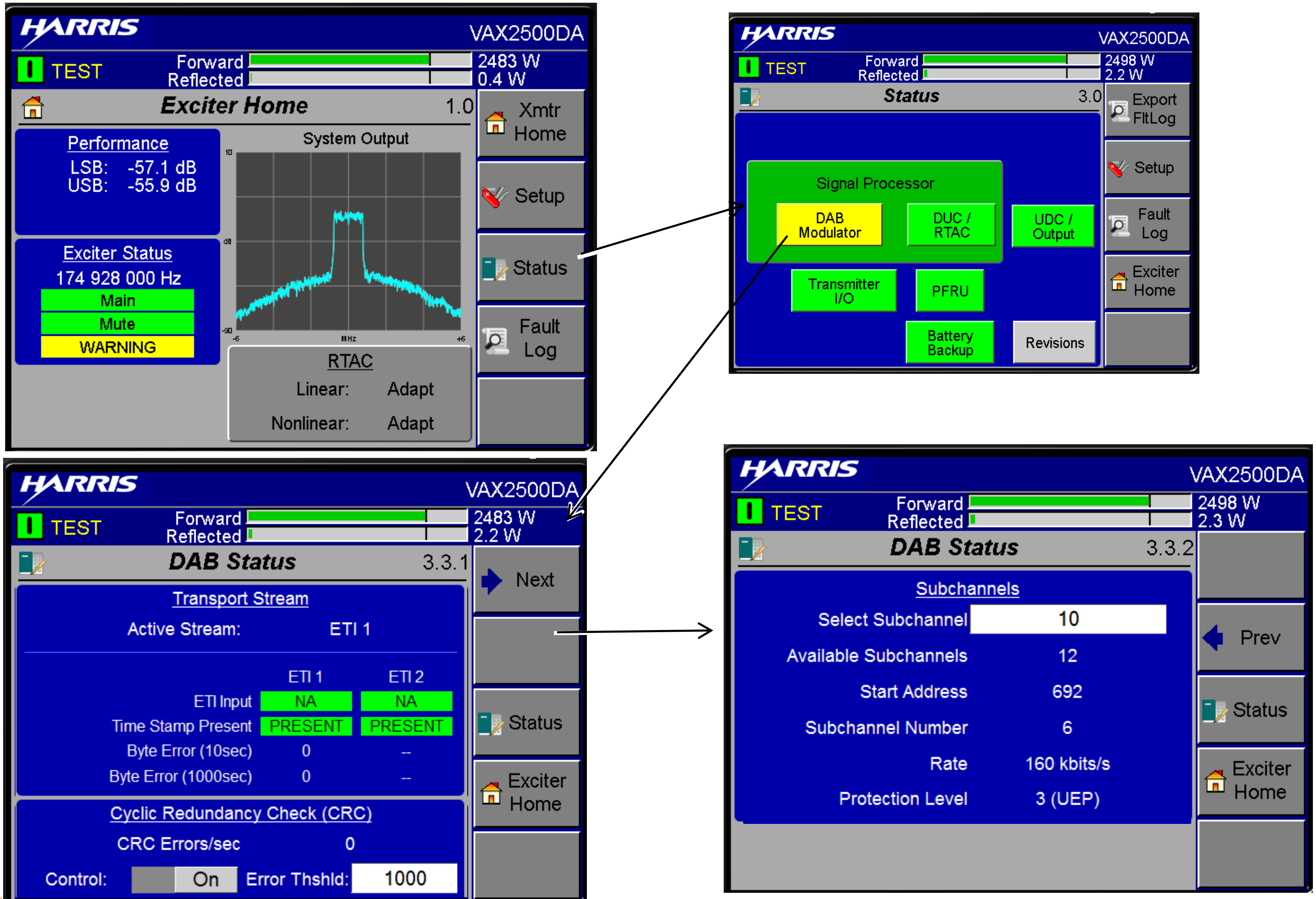
- 13 db:
No ETI input signal detected



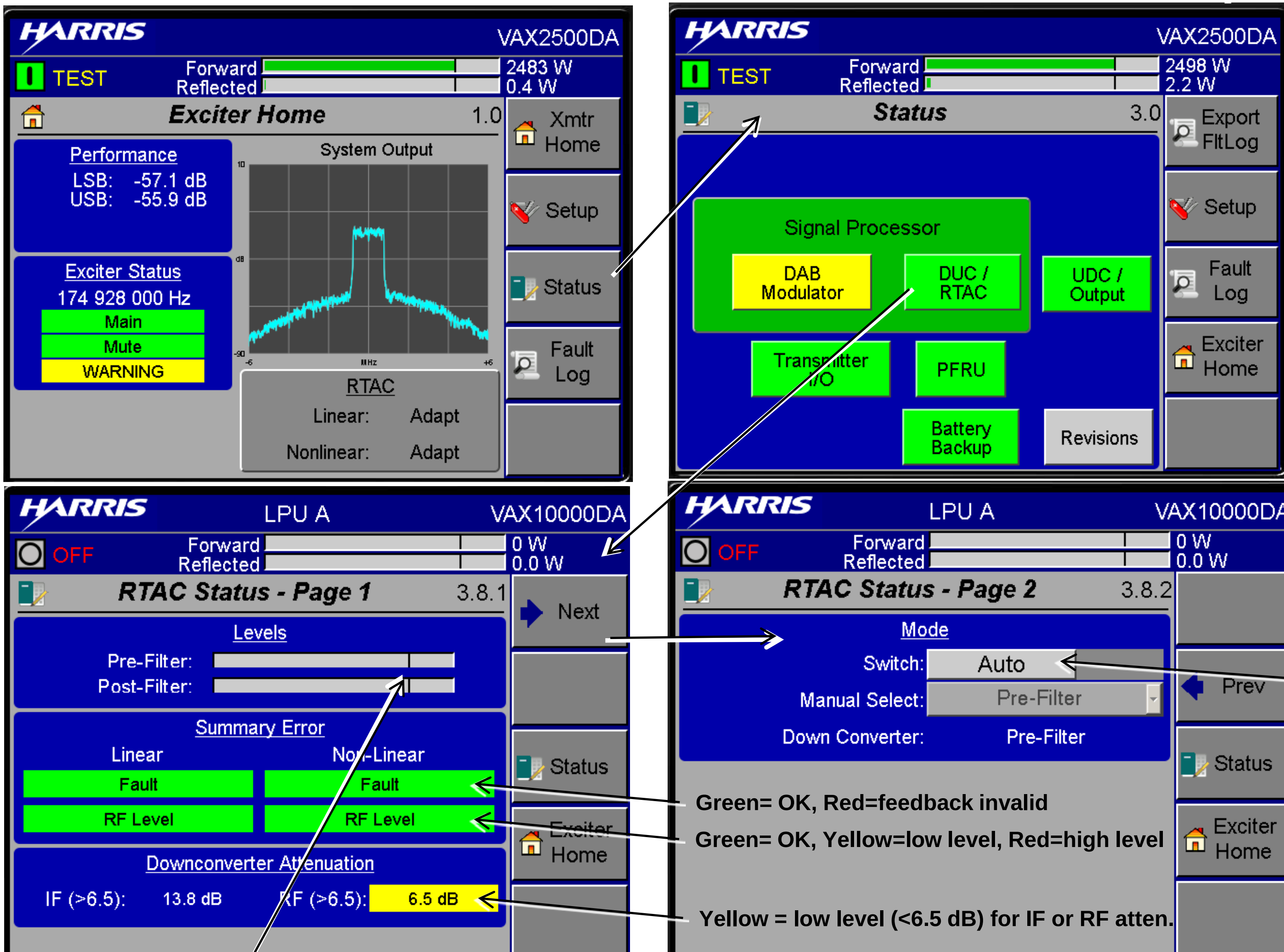
CRC-Control

ON:	**seamless switch if CRC errors exceed threshold**
OFF:	**errors reported, but no switch (unless errors would cause a mute).**

LPU STATUS PAGES



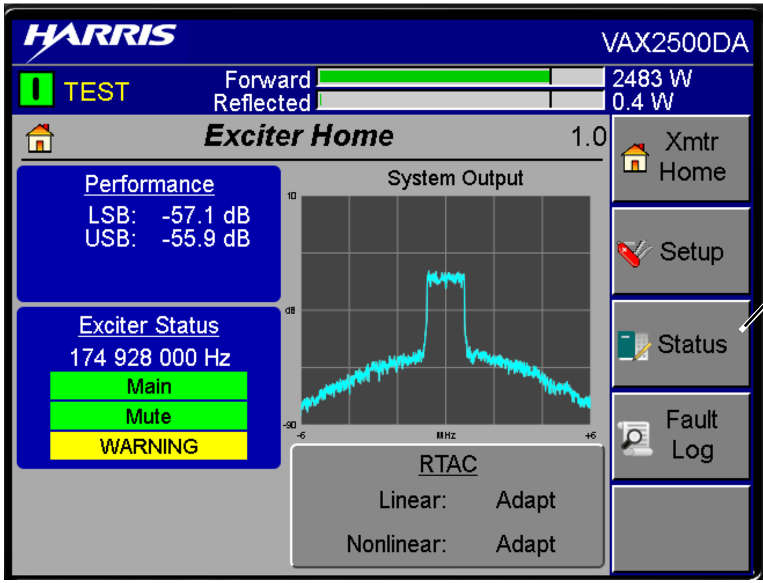
LPU STATUS DUC/RTAC

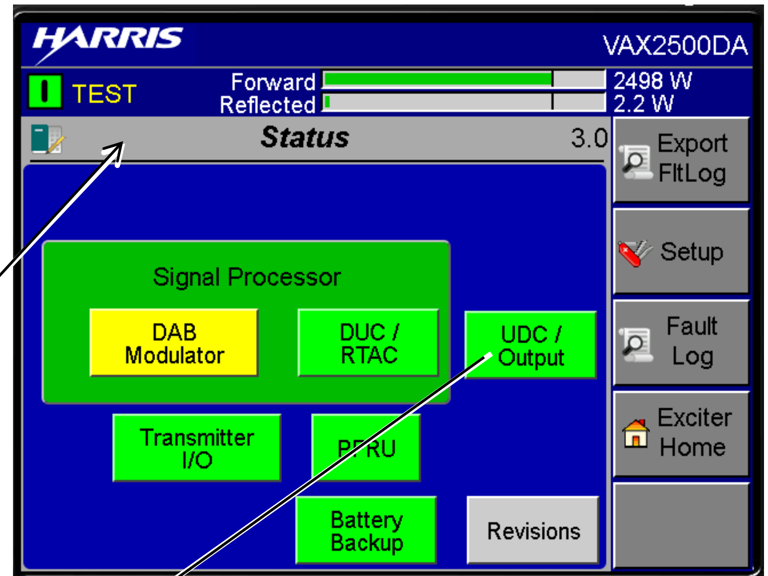


Manual is test mode. Auto switches between pre and post filter downconverter input samples.

Set RTAC sample levels to just below black lines.

LPU STATUS OUTPUT



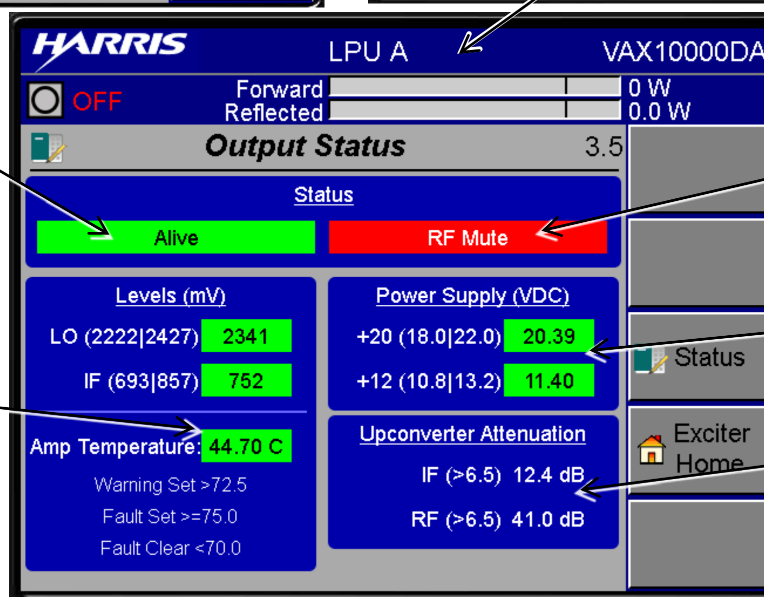


Green = UDC is communicating

Red = Fault

Upconverter Amp. Temp.

Faults at 70°C



Green= Unmuted

Red= Muted

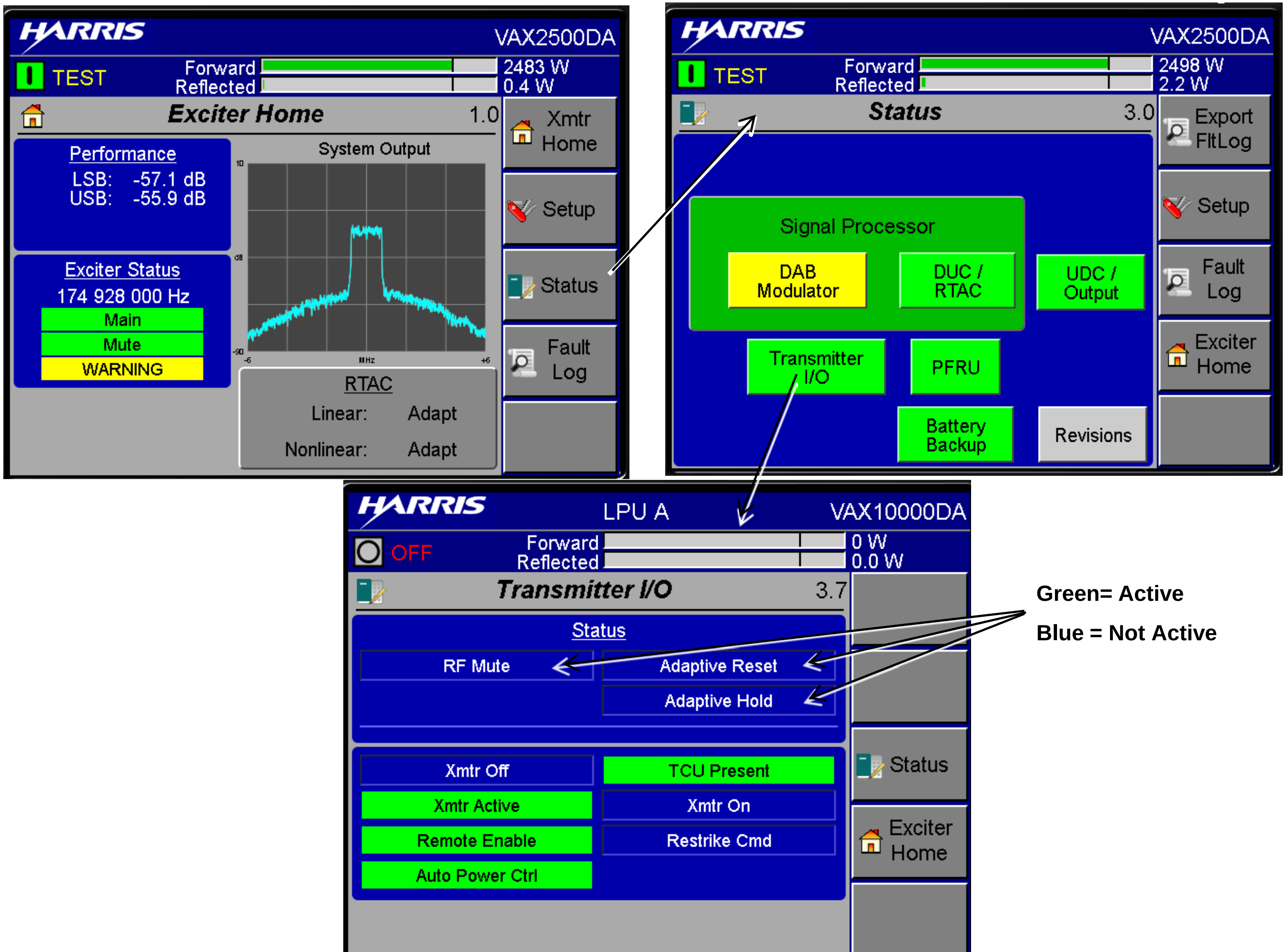
Upconverter Voltages

Should be within 10% of ref. value.

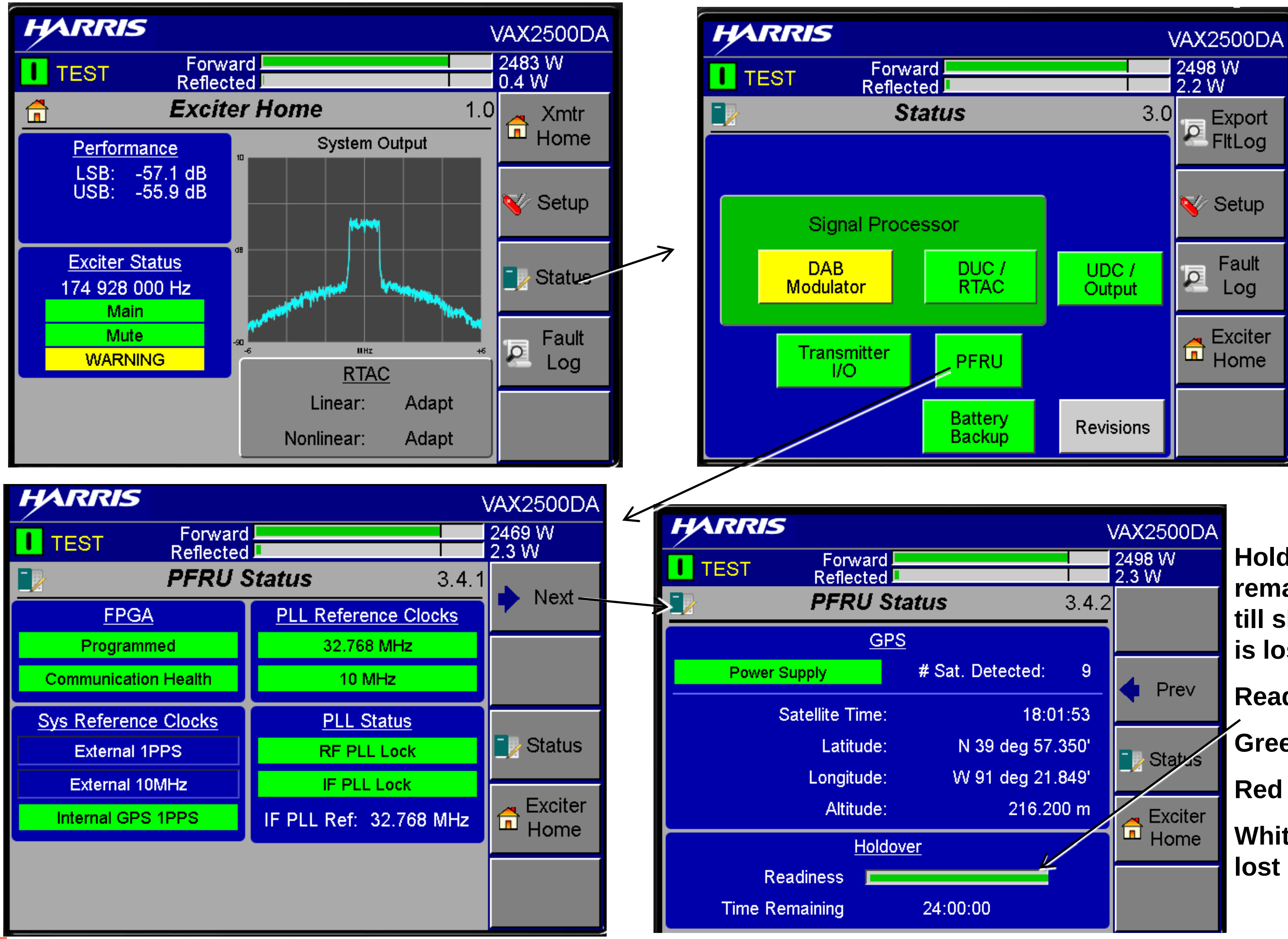
Upconverter Attenuation

Should be >6.5 dB

LPU STATUS TRANSMITTER I/O



LPU STATUS PFRU



Holdover = time remaining (hours) till shutdown if GPS is lost.

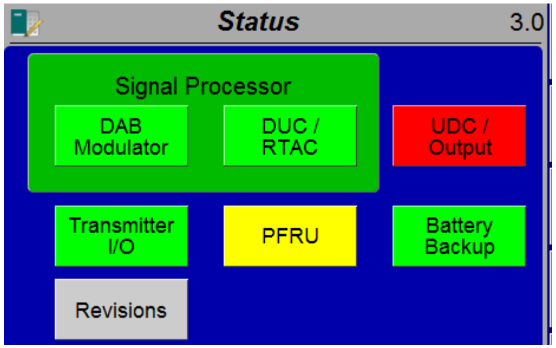
Readiness:

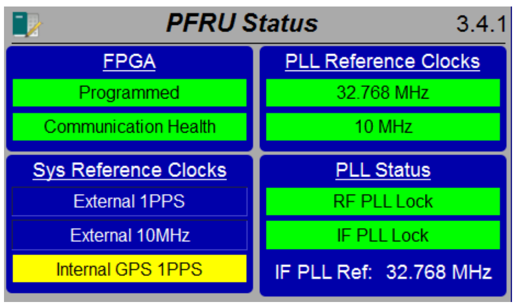
Green if >90%

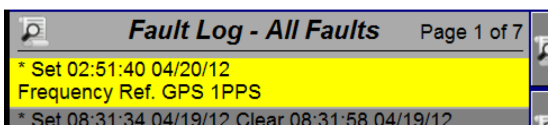
Red if<90%

White if 1 PPS ref. lost

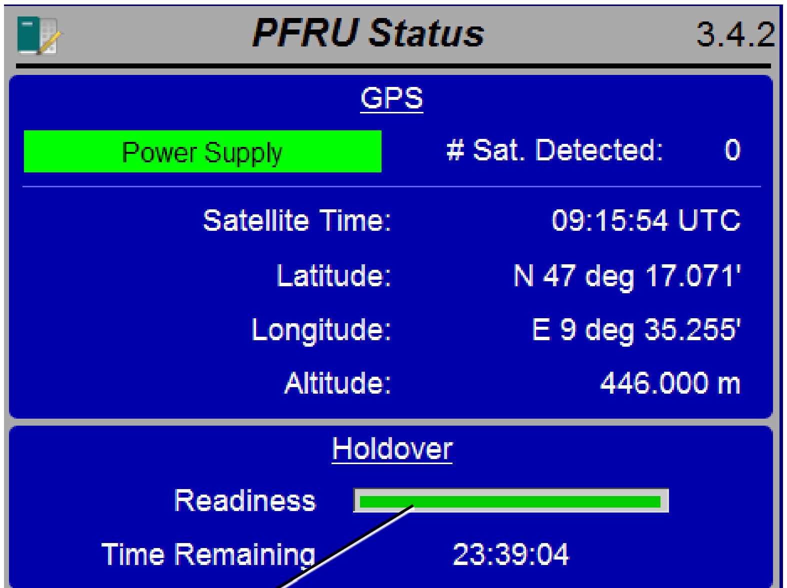
LPU STATUS PFRU







Behaviour in case of GPS loss

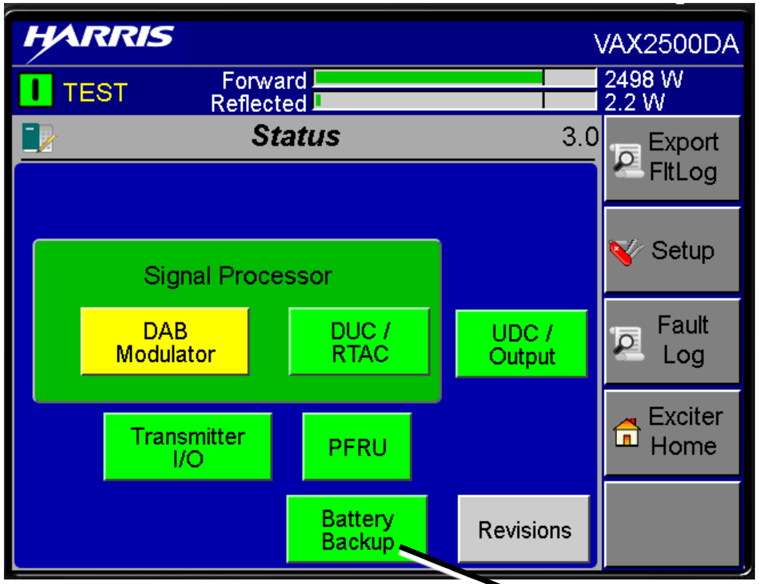


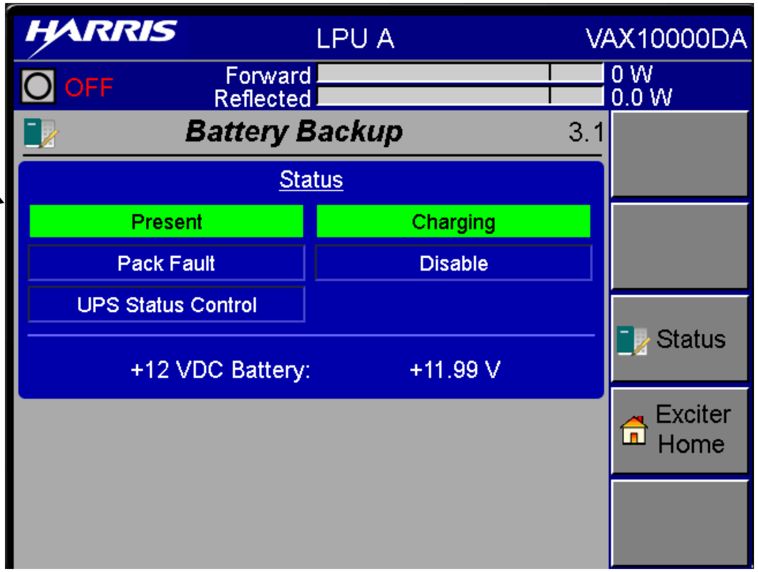
Limit value for shutdown: 20% of the protection interval of the DAB transmission mode

***PFRU drift rate spec.: < 18us in 24 hours*.**

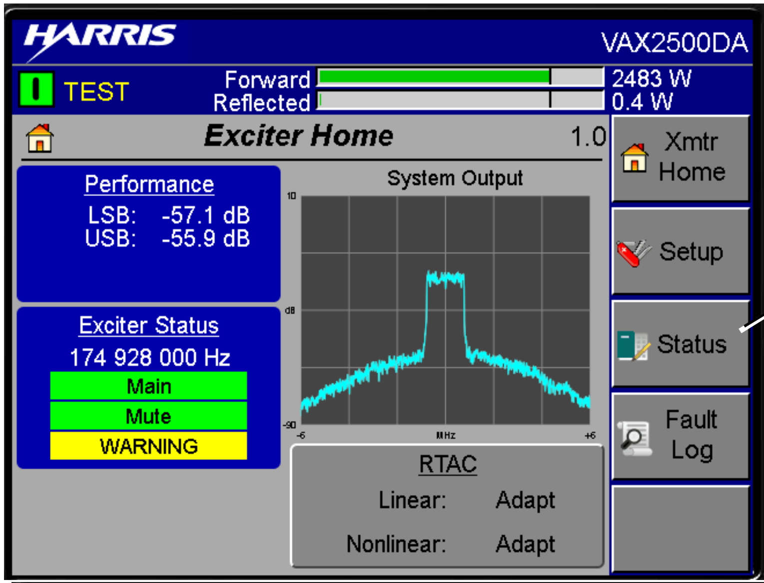
Mode I: GI = 246 us (20% = 49.2us) → >24hr timeout
Mode II: GI = 62 us (20% = 12.4us) → 16hr timeout limit
Mode III: GI = 31 us (20% = 6.2us) → 8hr timeout limit
Mode IV: GI = 123 us (20% = 24.6us) → >24hr timeout

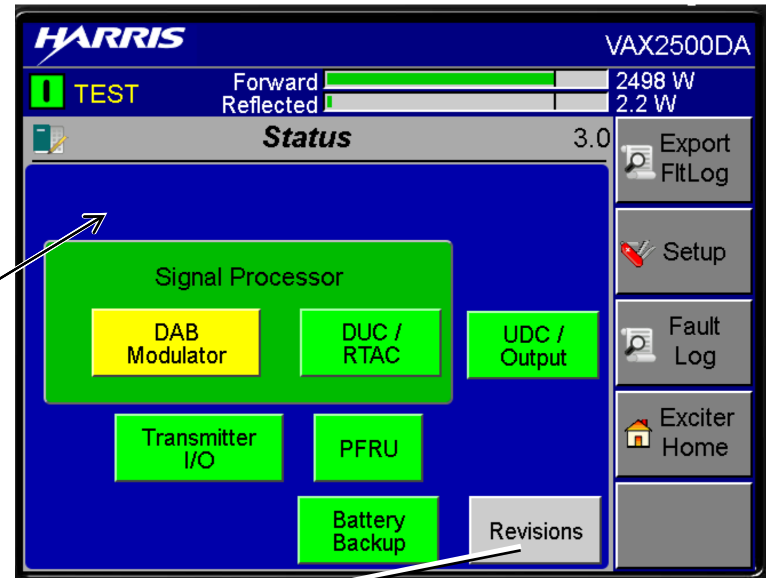
LPU STATUS BATTERY BACKUP

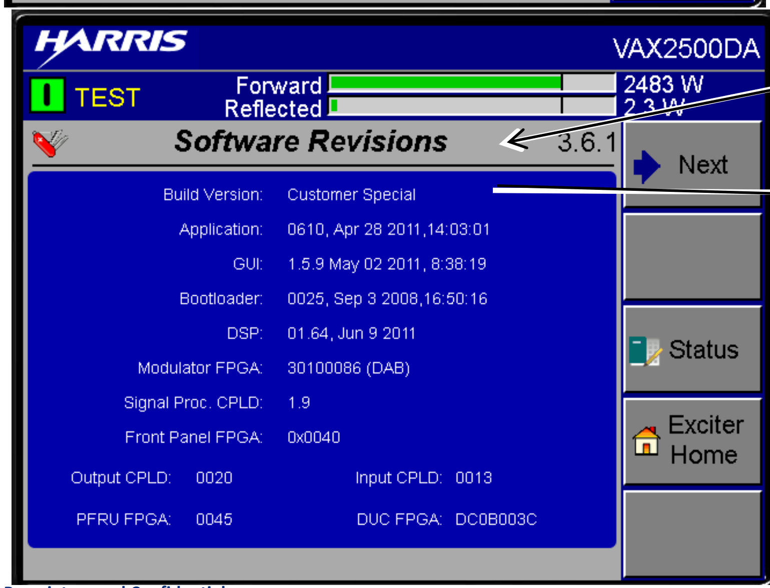




LPU STATUS REVISIONS

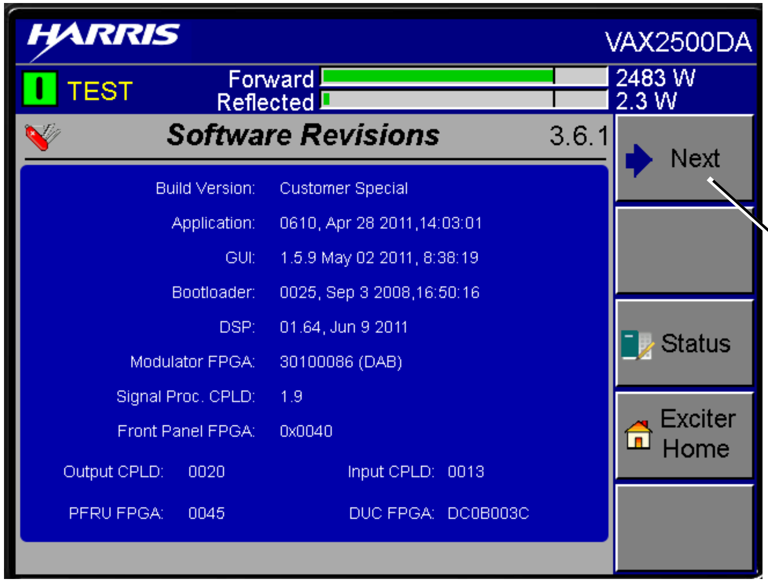


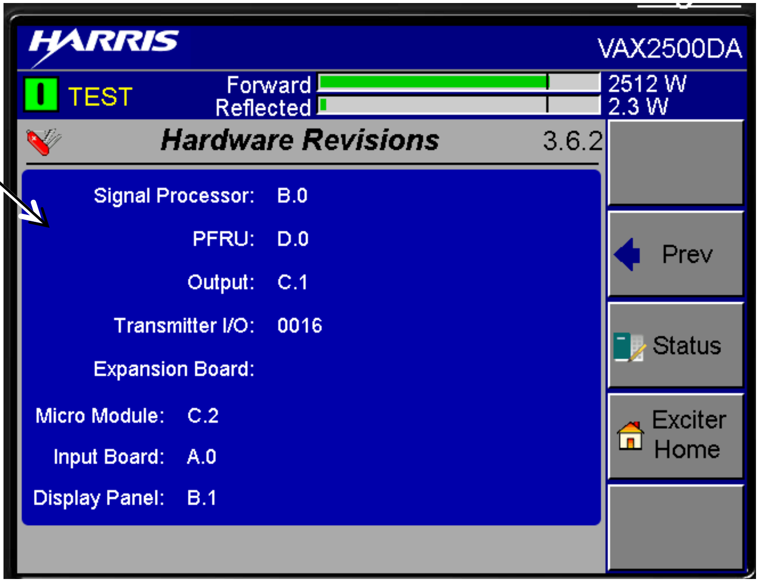




Build Version should appear as shown (part # REV#). If the LPU does not have all the proper software revisions installed for a particular build then “Customer Special” will be displayed.

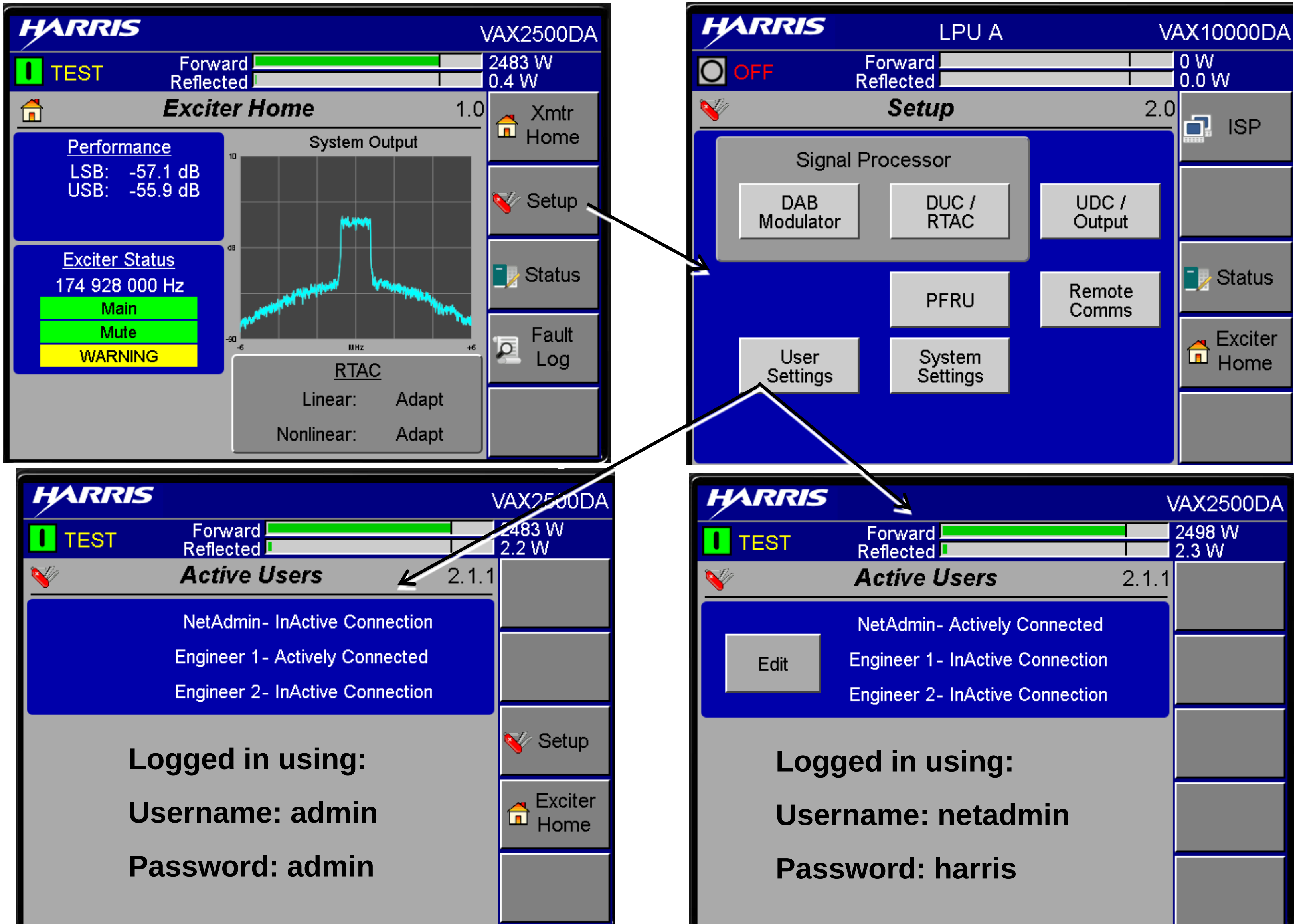
The full build should be installed when updating software. The full build contains all matching software components.

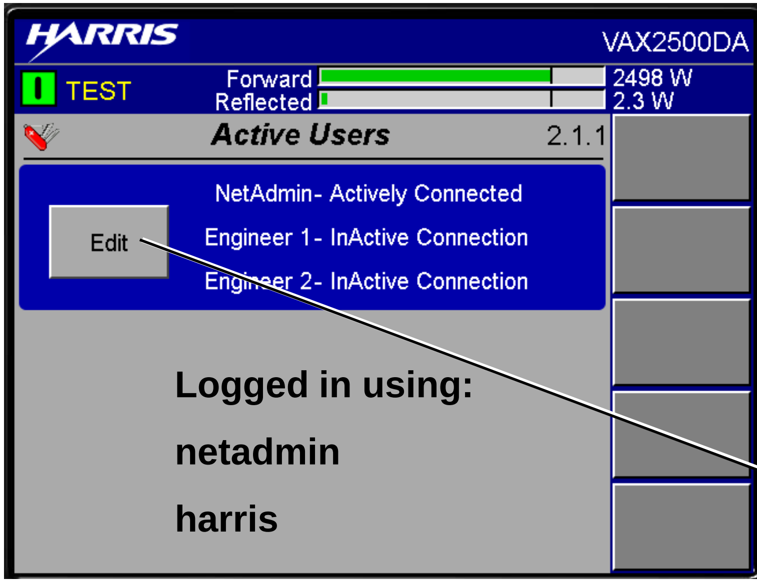




Expansion board used for DVBT-2.

LPU SETUP USER SETTINGS PAGES



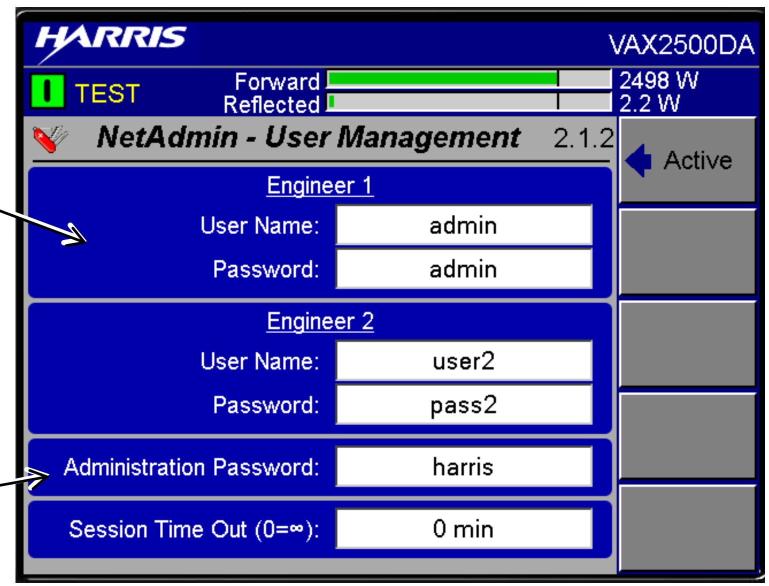


Logged in using:

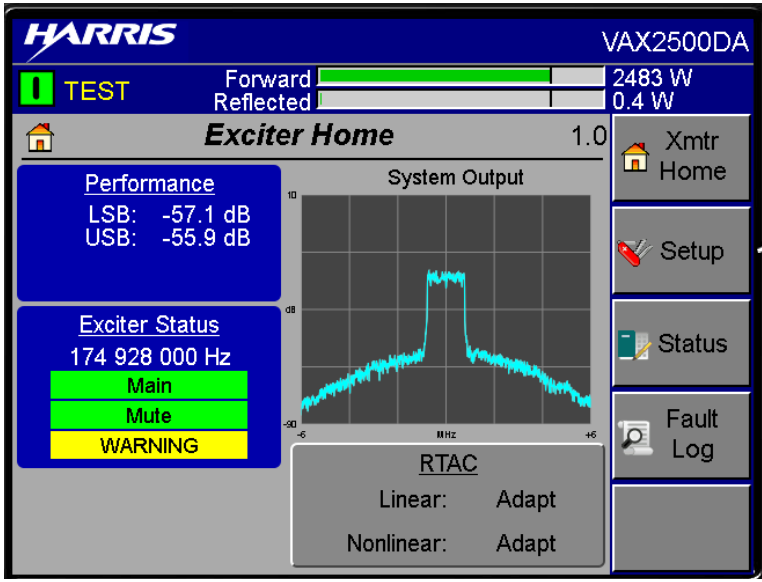
netadmin

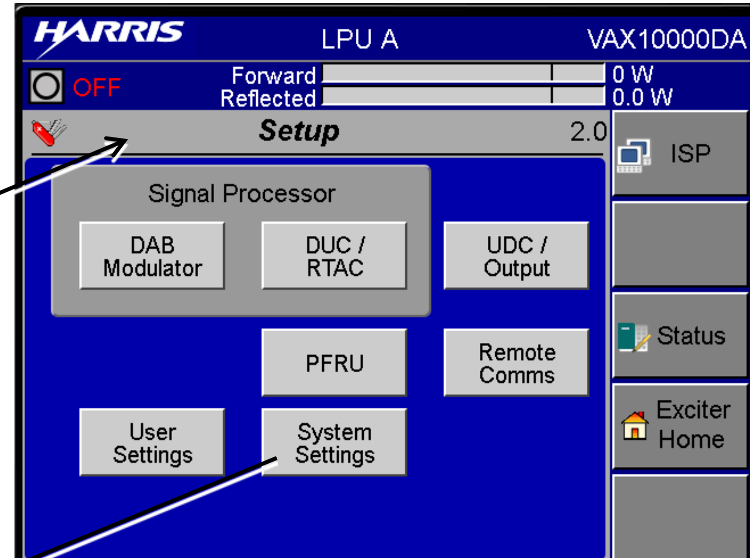
harris

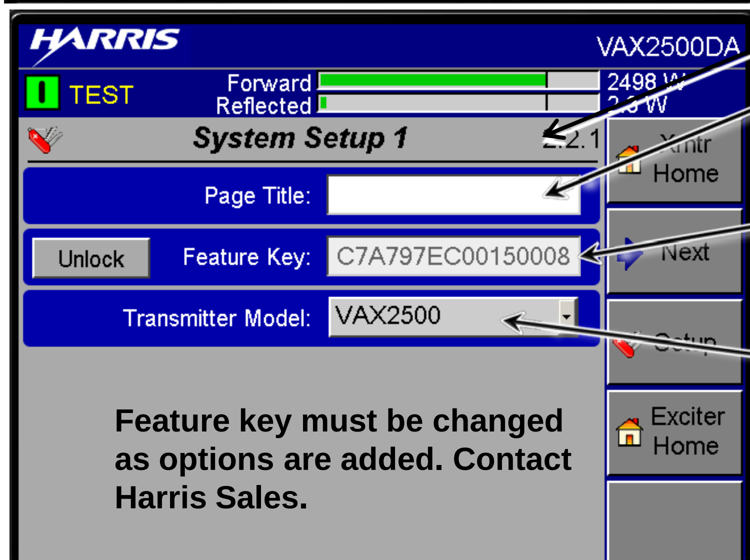
Must log out to exit.



Can't change NetAdmin login or password via GUI. Use serial port on rear of LPU and Teraterm.







Main header for each LPU page (e.g. Station name)

Unlock Feature Key or modulation standard (more info: next page)

Changing TX-Model will cause FWD-Power Reference = 0 !

Feature key must be changed as options are added. Contact Harris Sales.

```
Keys:
MH
ATSC
GPS
DVB
ISDBT
FLO
DAB
DVBT2
SFN
ATV
CTTB
CMMB
VAX
VAX
TEST
```

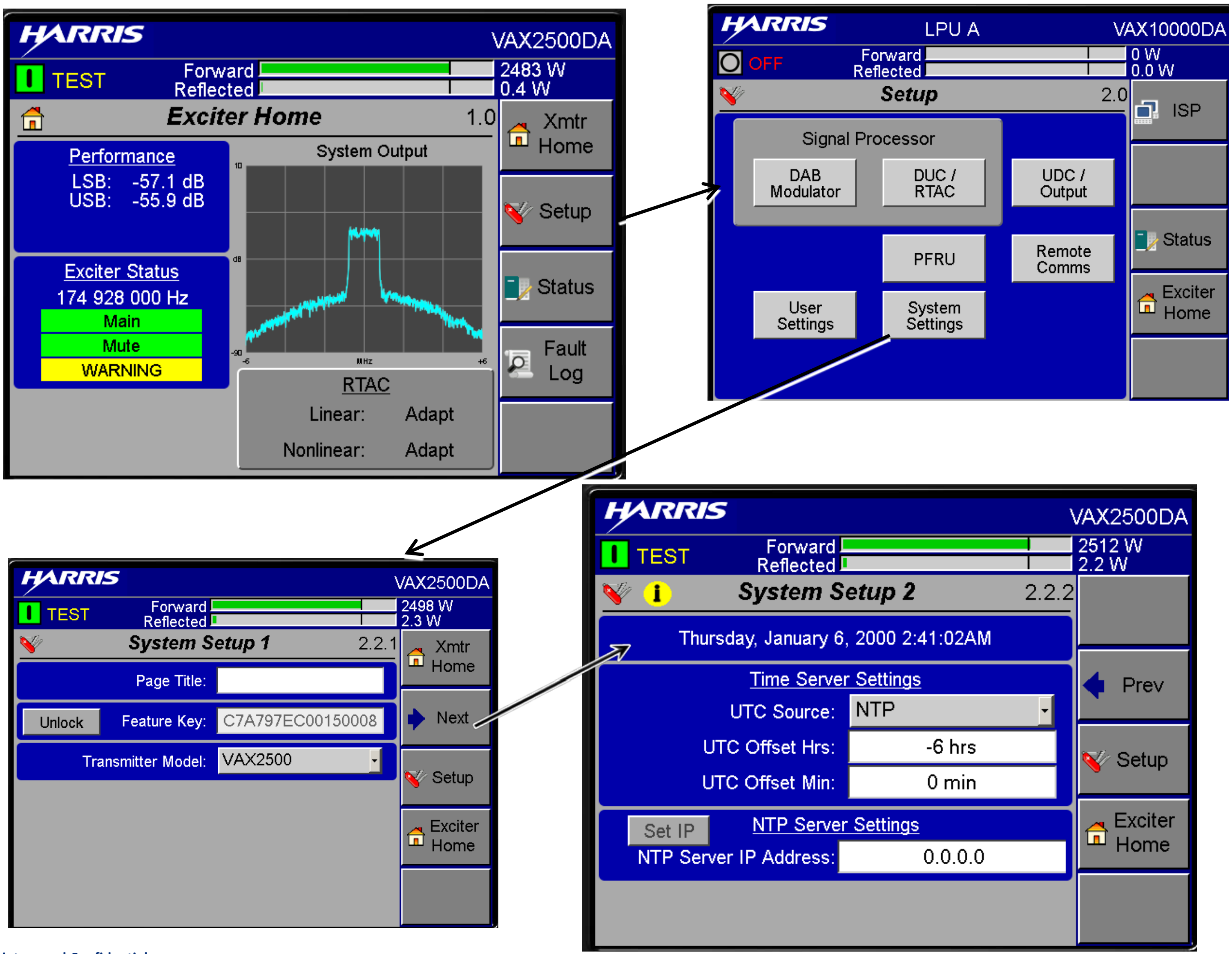
OVERVIEW MODUL. STANDARDS

- APEX-M2X System and Modulation Standards
  - ATSC American Television Standards Committee, North American 8VSB digital TV standard
  - ATSC A110 Single frequency network standard for ATSC
  - ATSC MH Mobile TV standard for ATSC (ATSC A/153)
  - DVB-T Digital Video Broadcasting - Terrestrial, European digital TV standard, COFDM
  - DVB-H Digital Video Broadcasting - Handheld, European digital TV standard, COFDM
  - DAB Digital Audio Broadcasting, European digital radio standard, COFDM
  - DMB Digital Multimedia Broadcasting, Korean digital TV standard transporting video information using the DAB standard.
  - ISDB-T South American and Japanese digital TV standard (Integrated Services Digital Broadcasting
  - CMMB China Mobile Multimedia Broadcasting
  - CTTB China Terrestrial Television Broadcasting
  - ATV Analog television

    PAL = Phase Alternate Line, analog TV standard (Europe and other Countries)

    NTSC = National Television Standards Committee, USA analog TV standard, system M
  - FLO Qualcomm mobile TV (FLO = Forward Link Only)

LPU SETUP SYSTEM SETTINGS



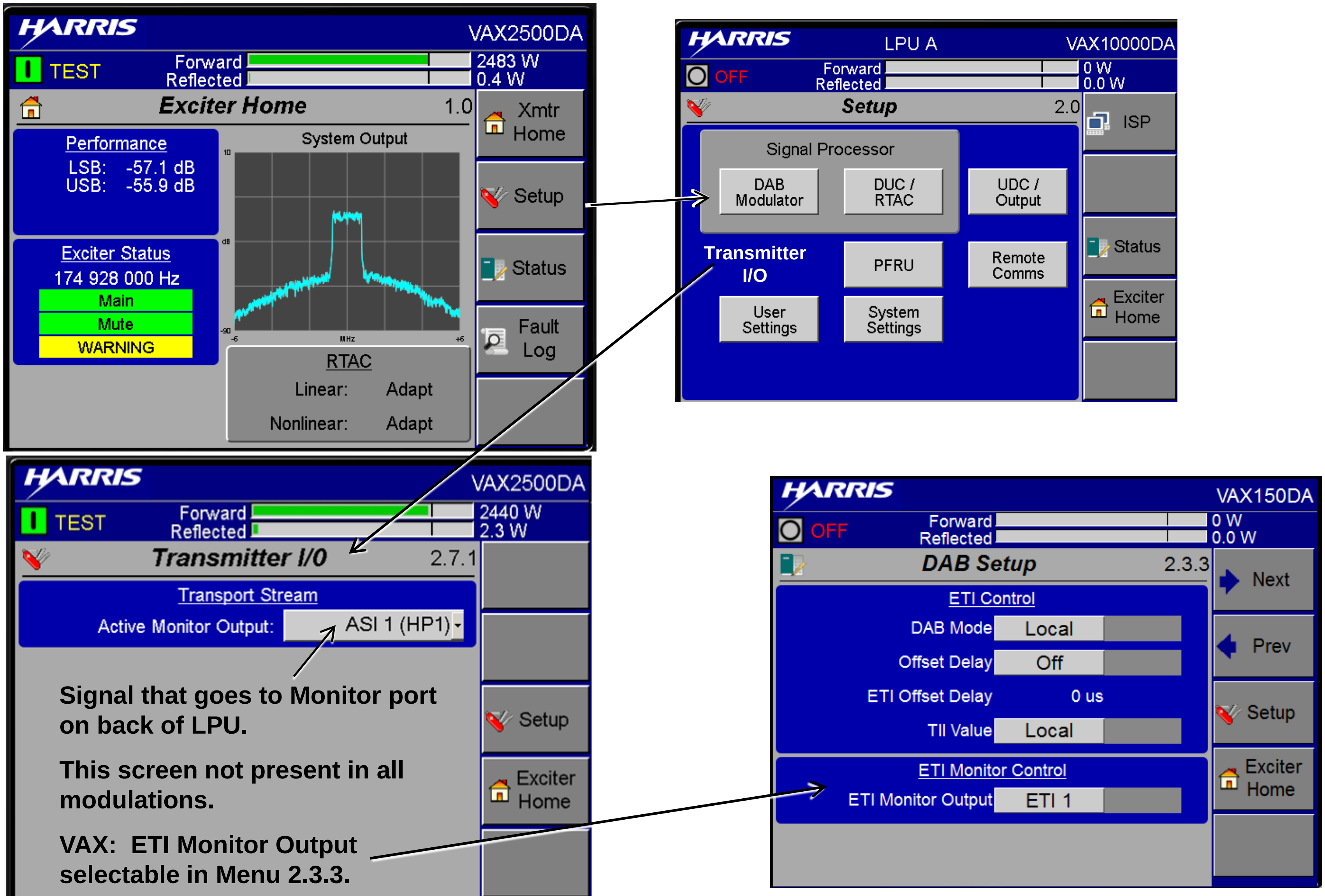
UTC: Universal Time Coordinated

UTC Sources:

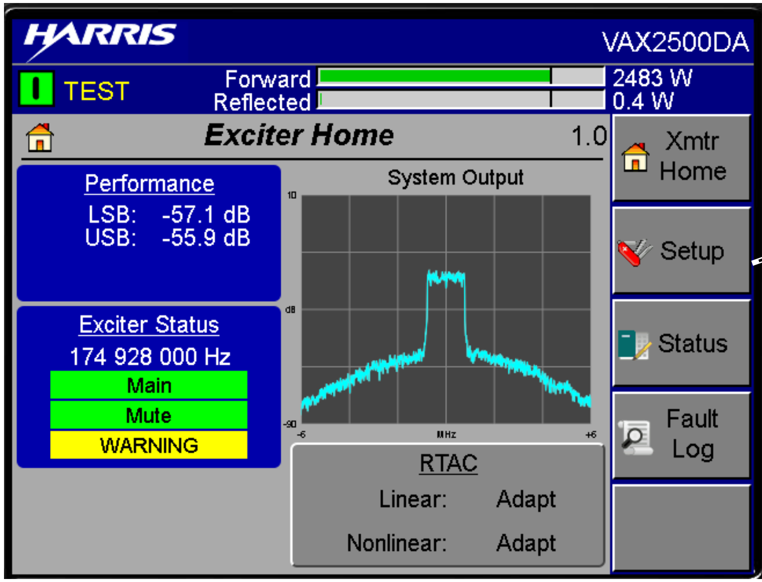
- **None**
- **GPS**
- **NTP (Network Time Protocol)**

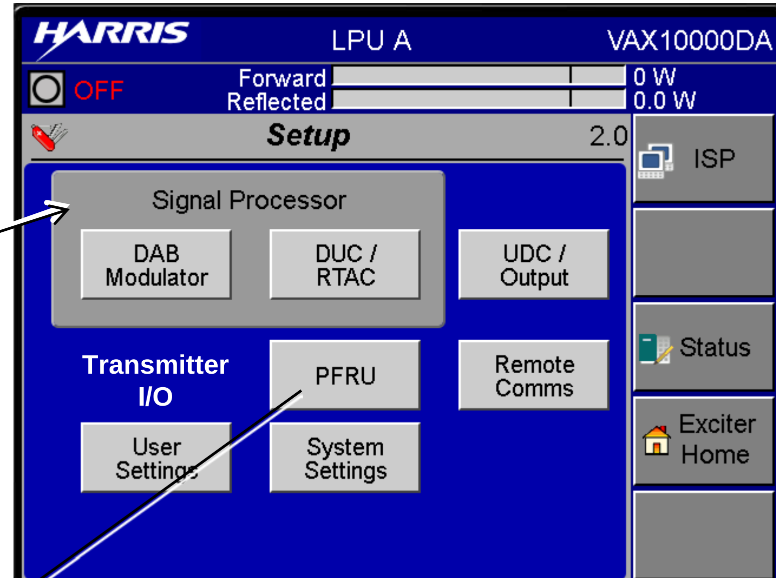
Max. Offset: -13h….+13h

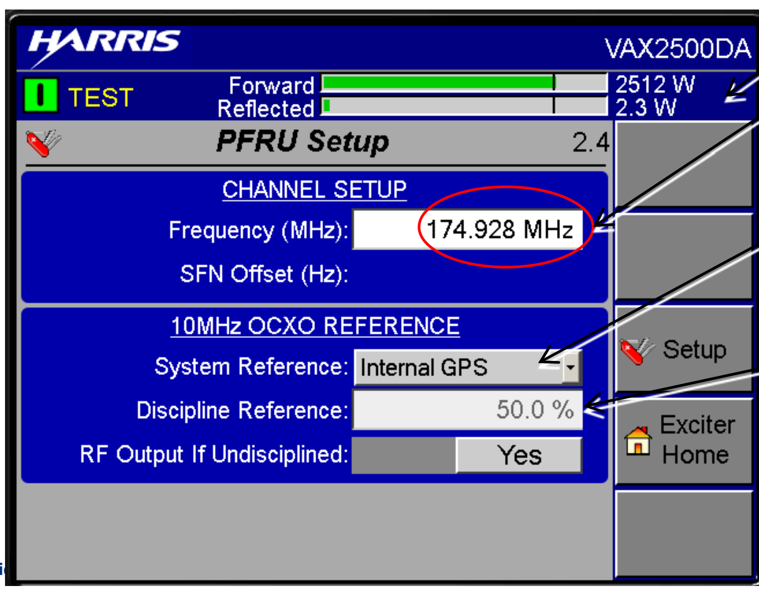
LPU SETUP TRANSMITTER I/O, PRFU



LPU SETUP TRANSMITTER I/O, PRFU





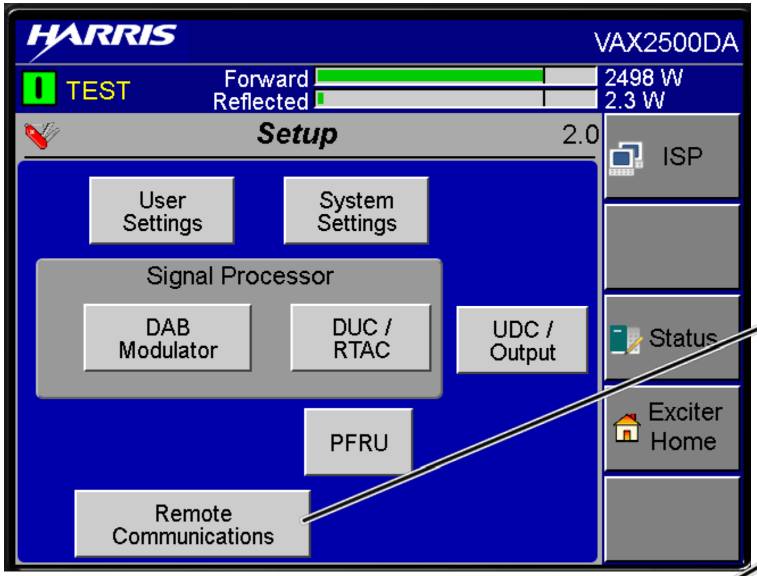


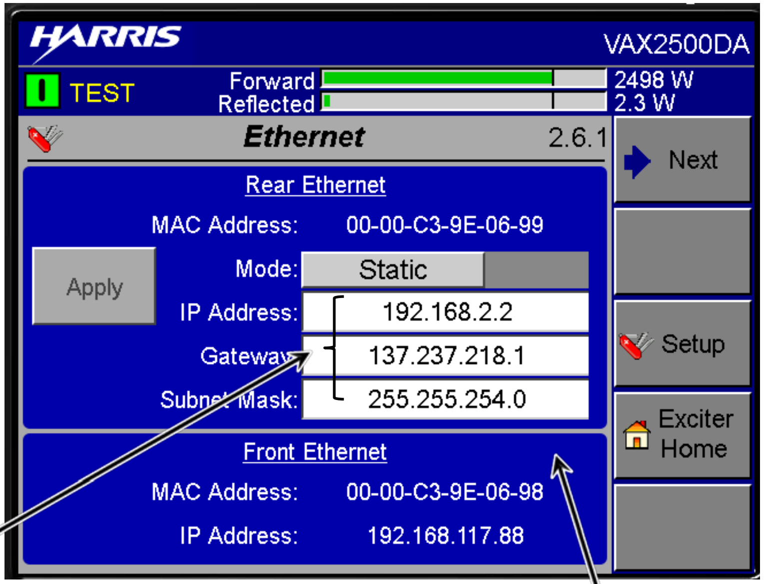
Set frequency here w/o TCU.

Internal GPS
Ext. 1pp
Ext. 10 MHz
Manual
(Only GPS & 1PPS in SFN)

Used in Manual mode only.

(rough tuning range: 10MHz +/- 10Hz
~ 9.99999140561 MHz to ~ 10.0000107215 MHz)



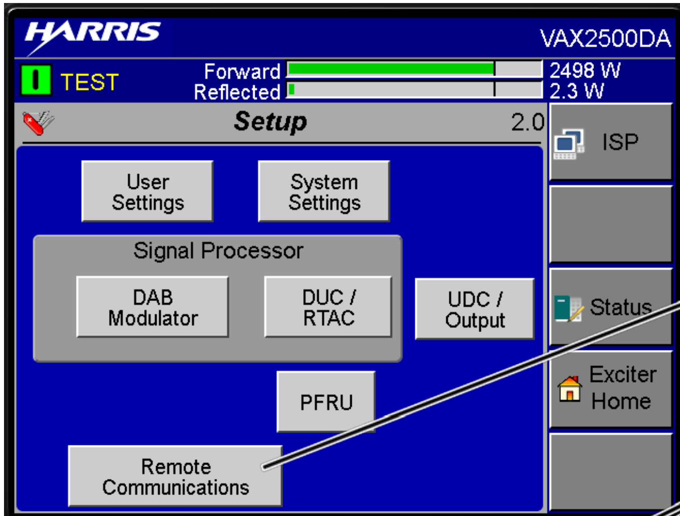


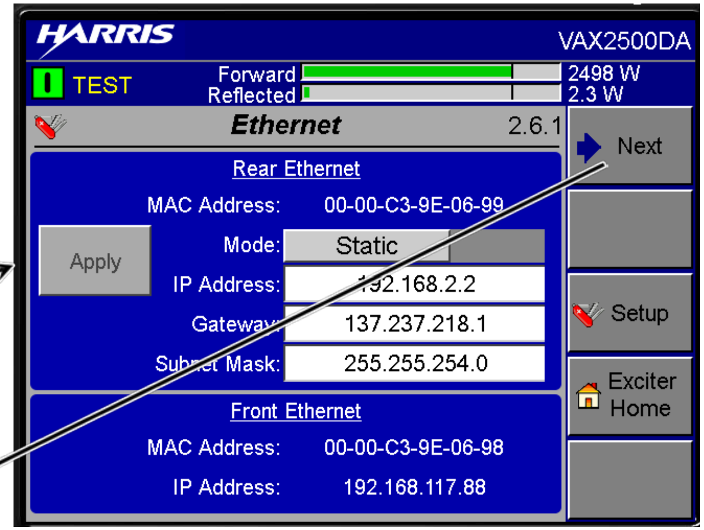
Set for LPU A

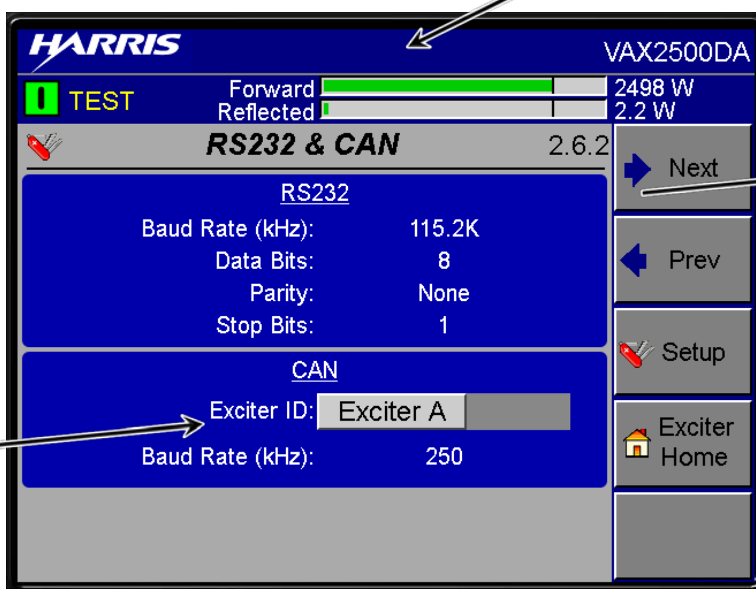
Need front MAC address for new feature key.

General IP Settings for LPU A and LPU B

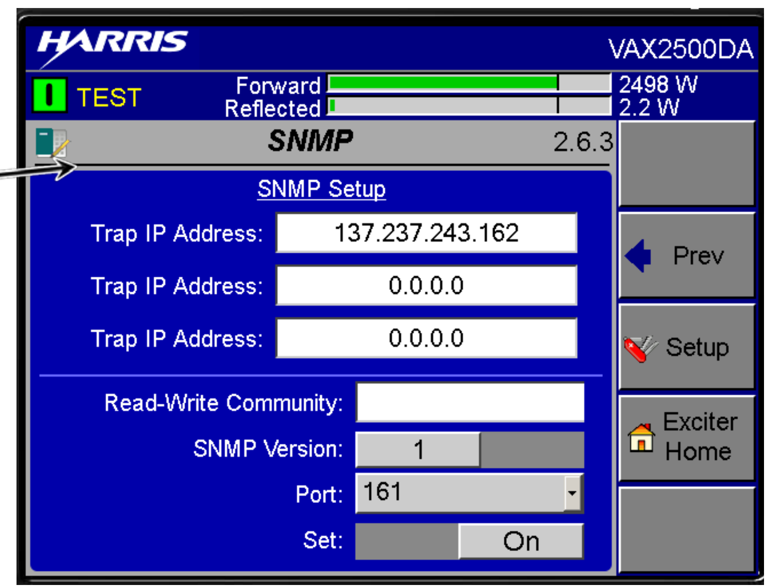
Setting	LPU A	LPU B
Mode	Static	Static
IP Address	192.168.2.2	192.168.2.3
Gateway	192.168.2.100	192.168.2.100
Subnet Mask	255.255.254.0	255.255.254.0



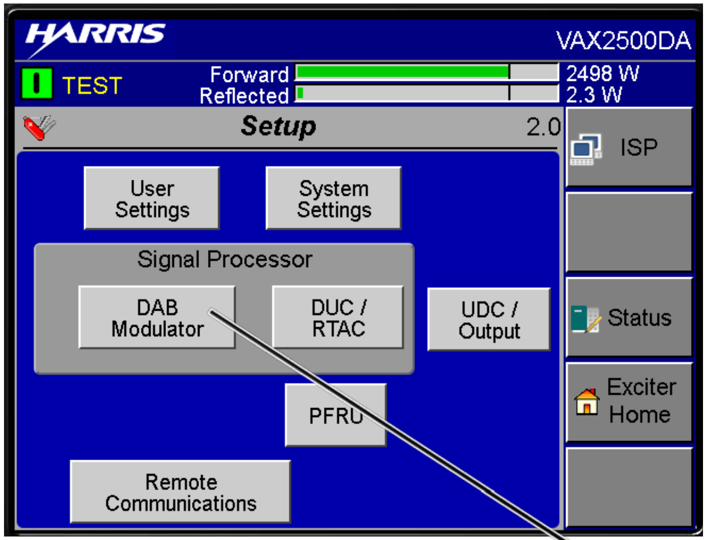




Can't be set same on both LPU's. Will cause LPU's to cycle ON/OF.



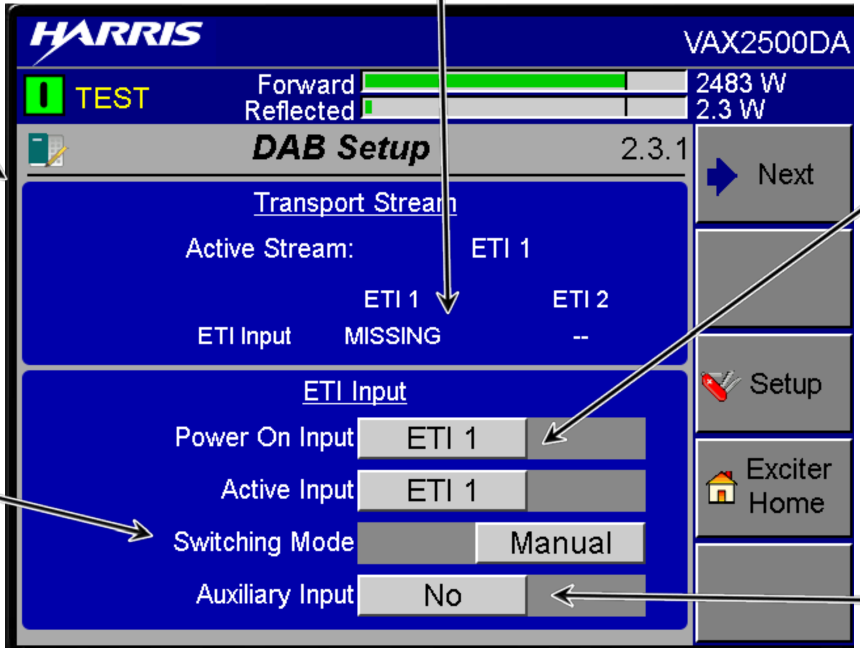
LPU SETUP DAB MODULATOR SCREENS



Input signal Information:

---- :	**Input not activated / not considered**
Missing:	**Signal expected, but not present**
NI:	**ETI signal with Layer NI (Network Independent)**
NA:	**ETI signal with ETI NA (Network Adapted)**

Additional ETI input information visible in the DAB-Modulator Status-Screen



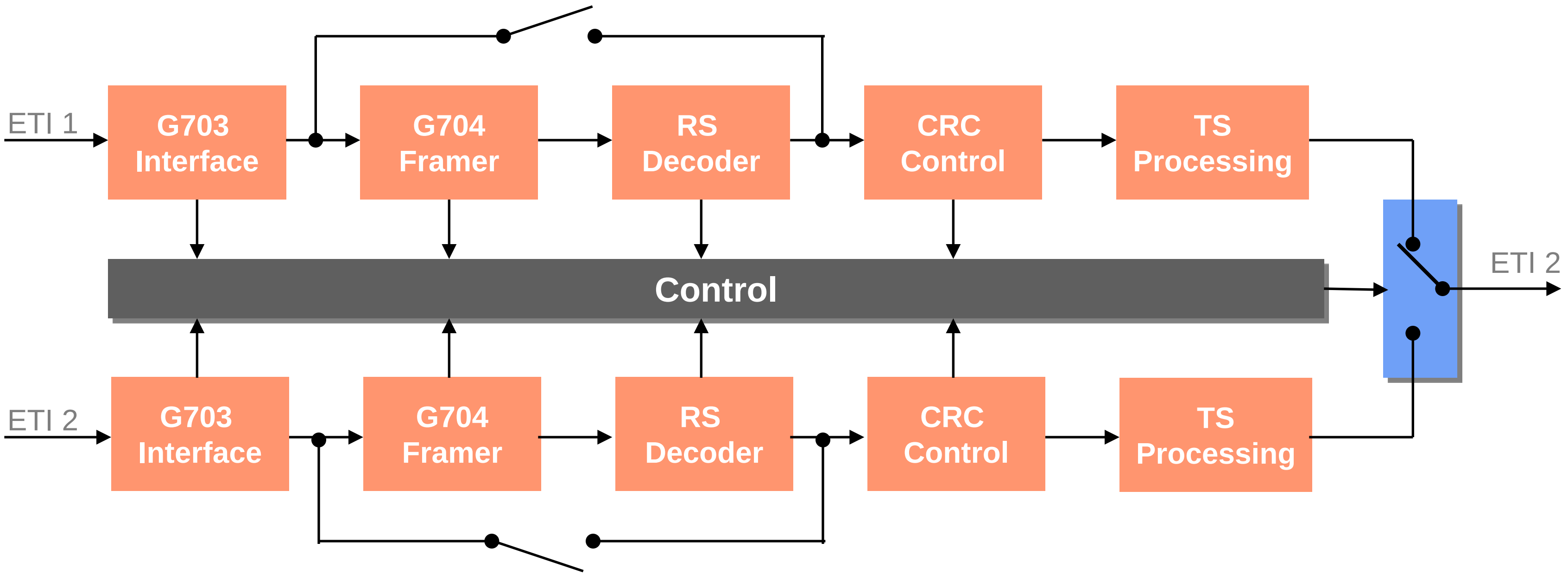
Comes on to this after power bump.

Manual or automatic switching mode (Seamless switching) between ETI 1 and ETI 2 input

Seamless switching: more info see next page

Yes if second input available.

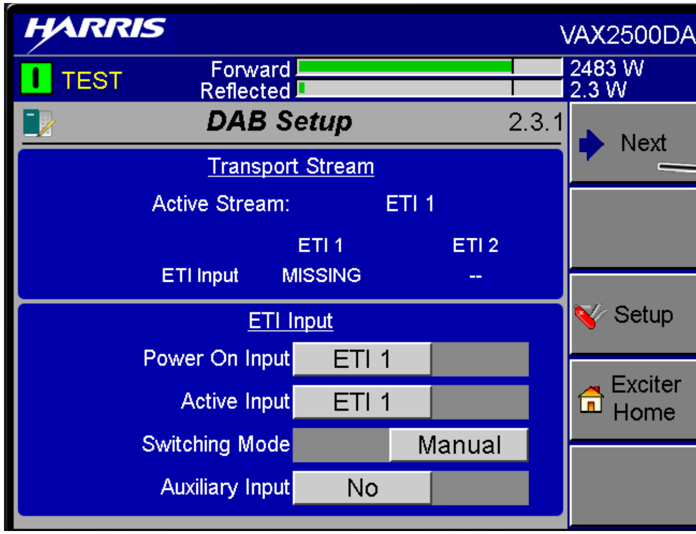
SEAMLESS SWITCHING OF ETI-INPUTS

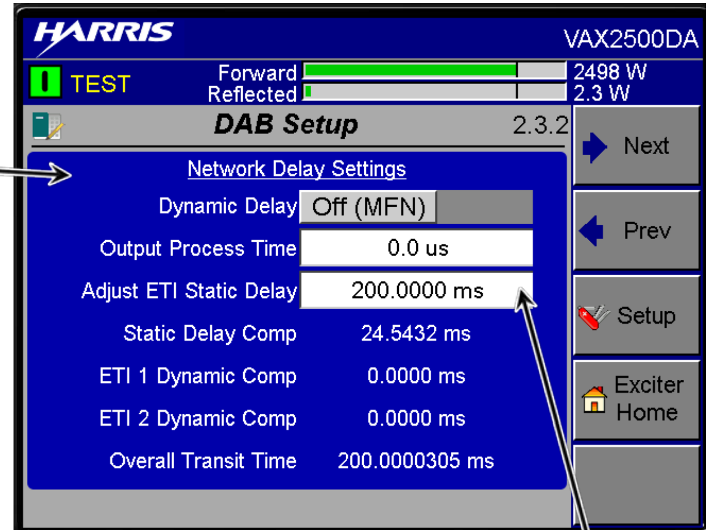


- Two independent ETI Input Terminals
- Seamless switching frame by frame
- Indication of corrupted bytes per RS - block (ETI(NA))

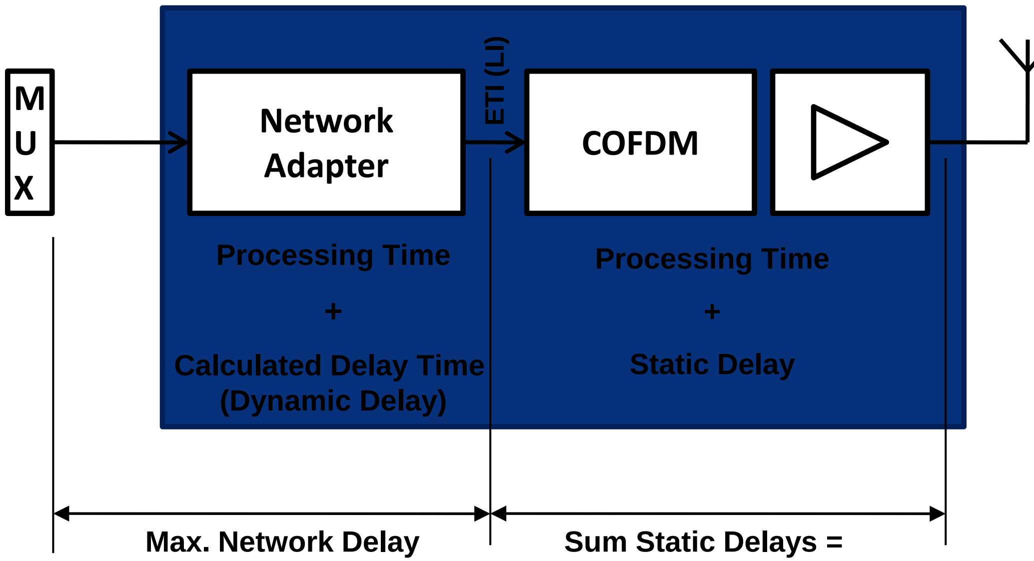
- CRC check in EOF and EOH for both inputs
- Automatic selection of the stream with the better quality

LPU SETUP DAB MODULATOR SCREENS





Overview Delay Times in DAB



Adjust ETI Static Delay = Processing Delay + Static Delay Comp

200ms = 175.4569 ms + 24.5432 ms

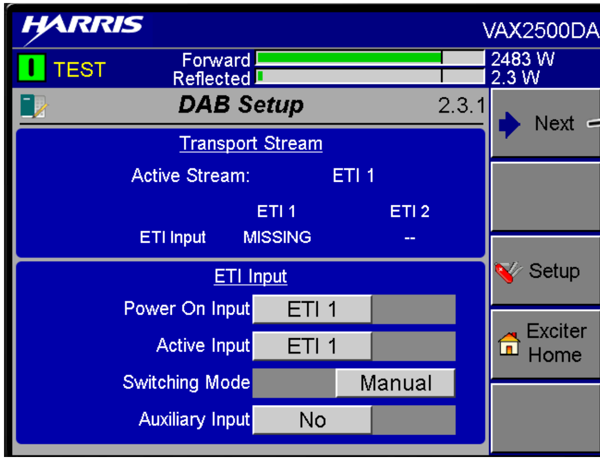
This means no values lower than the processing delay can be entered

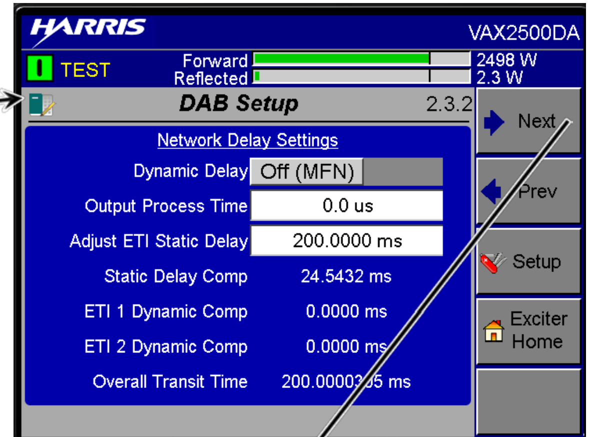
Processing Delay Times:

Dyn. Delay OFF: 175.4569 ms

Dyn. Delay ON: 100.6074 ms

LPU SETUP DAB MODULATOR SCREENS



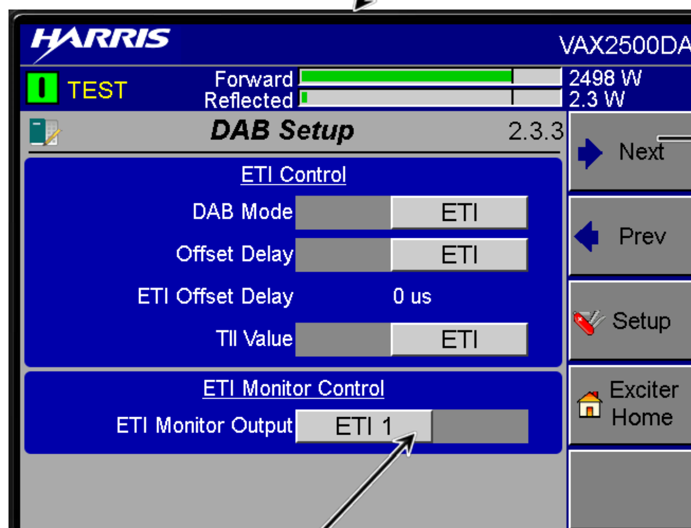


MNSC – Control

(Multiplex Network Signaling Channel)

Parameters which can be controlled remotely via ETI input signal:

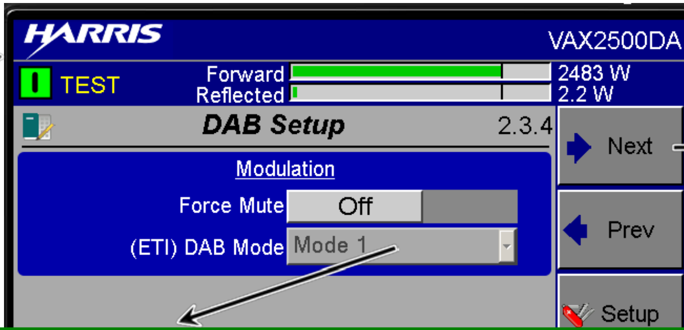
- **DAB-Mode**
- **Offset Delay**
- **TII Value**



Next Page

Selection which signal goes to monitoring output on back of LPU

prev. Page



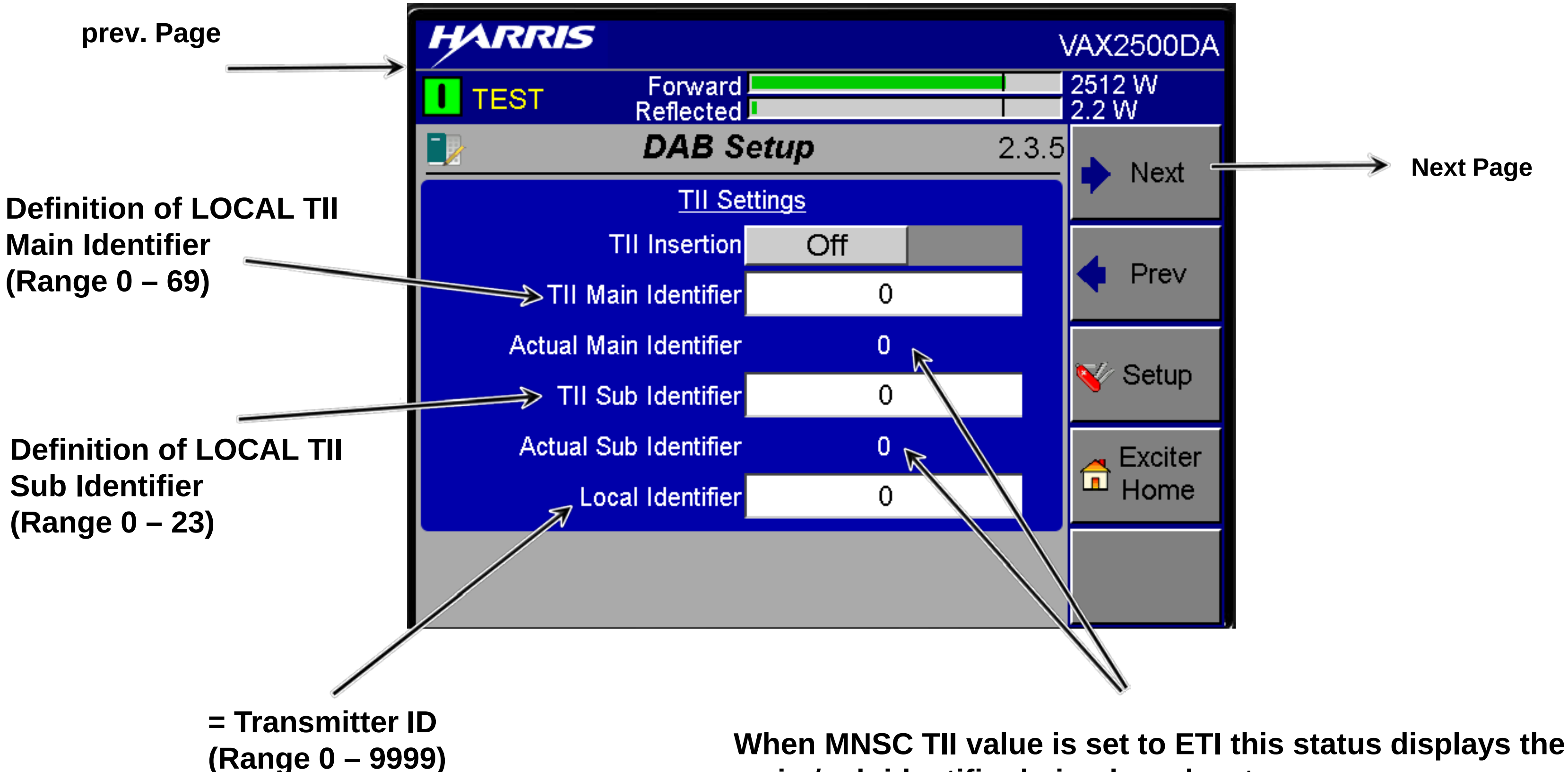
Next Page

DAB – Modes:

Mode 1: used for DAB Transmission in Band 3 (176-240MHz)
Mode 2, 4: used for DAB Transmission in the L-Band (1452-1492MHz)
Mode 3: reserved for satellite transmission (not used)

	DAB Mode 1	DAB Mode 2	DAB Mode 3	DAB Mode 4
Frequency bandwidth	1536 kHz			
Useful bit rate	1500 kbit / s			
Number of subcarriers	1536	384	192	768
Subcarrier spacing	1 kHz	4 kHz	8 kHz	2kHz
Total symbol duration	1246 µs	312 µs	156 µs	623 µs
Useful symbol duration	1000 µs	250 µs	125 µs	500 µs
Guard interval	246 µs	62 µs	31 µs	123 µs

TII: Tansmitter Identification Information

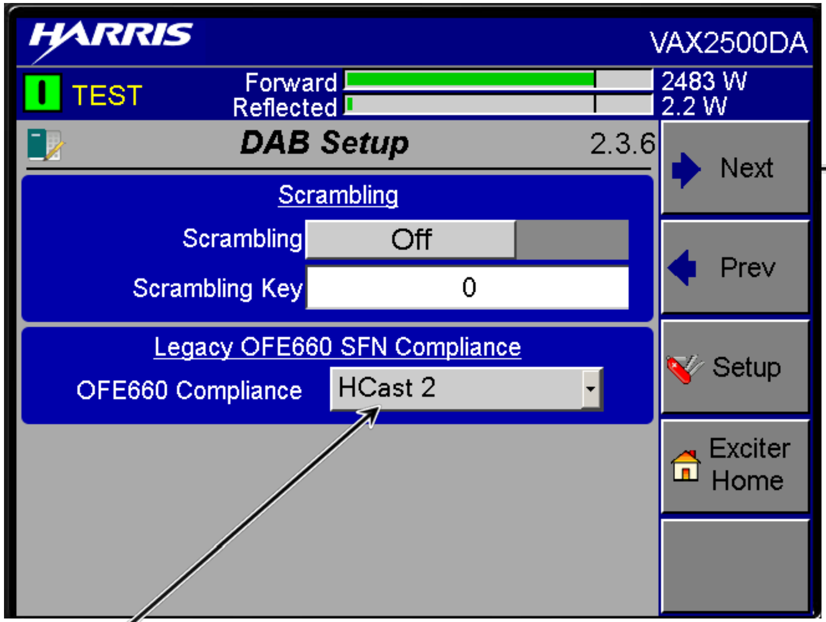


When MNSC TII value is set to ETI this status displays the main /sub identifier being broadcast.

When MNSC TII value is set to LOCAL this status displays the main / sub identifier defined in the field above

LPU SETUP DAB MODULATOR SCREENS

prev. Page



Next Page

Definition of crambling Key Range: 0 - 255

Legacy SNF Compliance:

Difference in insertion of padding bits for the Main Service Channel of a DAB signal

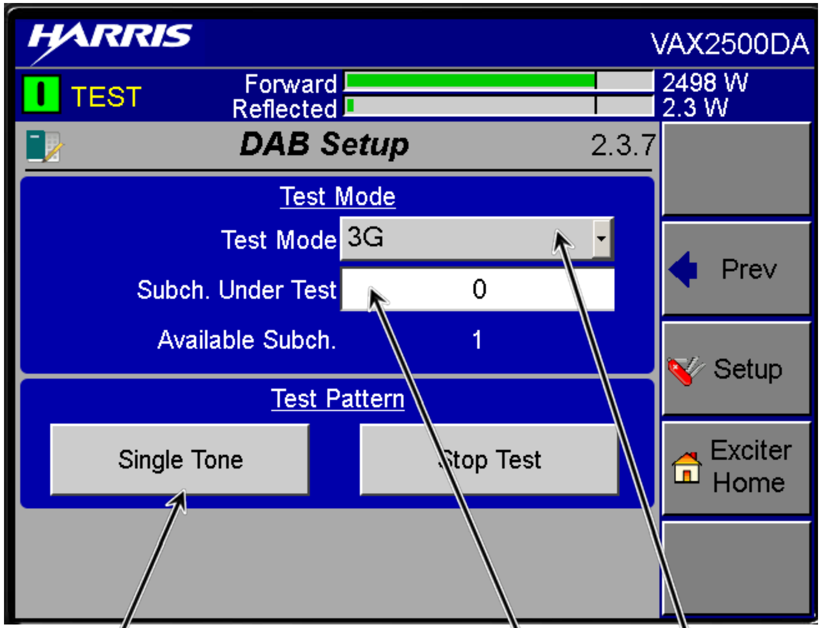
HCAST1: insertion of padding bits takes place before Convolutional Coder.

HCAST2: Padding bits are added after the Convolutional Coder and puncturing (= fully compliant to the ETSI-specifications)

In new DAB SFN-Networks HCAST 2 will be the correct setting

LPU SETUP DAB MODULATOR SCREENS

prev. Page

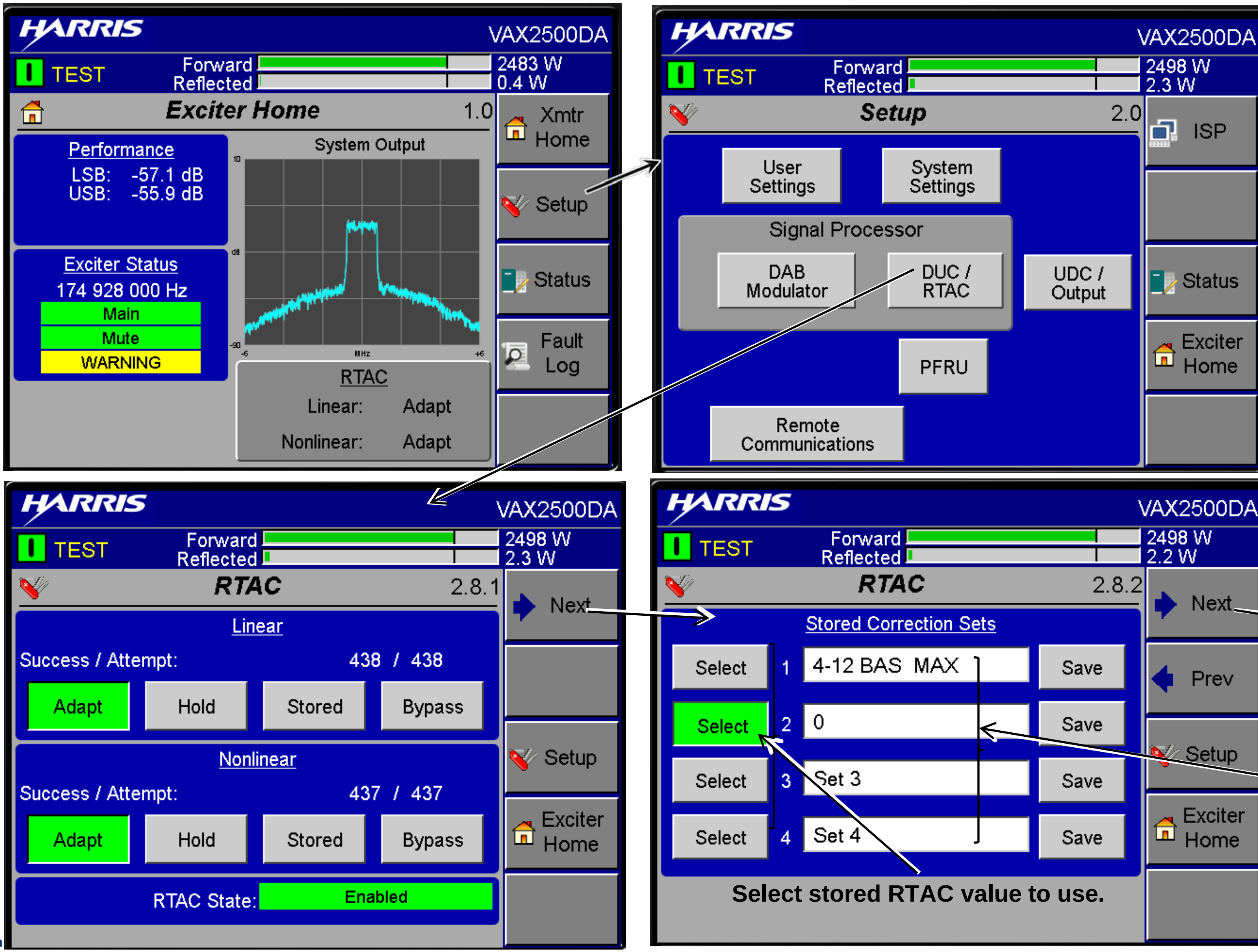


Single Tone will allow to measure frequency stability at the Tx-Output

3 operation modes:

- **OFF = Online Operation:** **a valid DAB-Signal is produced in mode 1,2,3 or 4 (= normal operation)**
- **Online = Online Testmode:** **PRBS (Pseudo Random Binary Sequence) signal is superimposed on a selected subchannel.**
- **3G = Local test operation:** **fixed multiplex structure acc. to the 3rd generation including FIC (Fast information Channel - acc. ETS 300 401 of May 97) is produced. Selected Subchannel is overlapped with PRBS, data of all other subchannels are set to „0“**

LPU SETUP DAB DUC/RTAC



Next Page

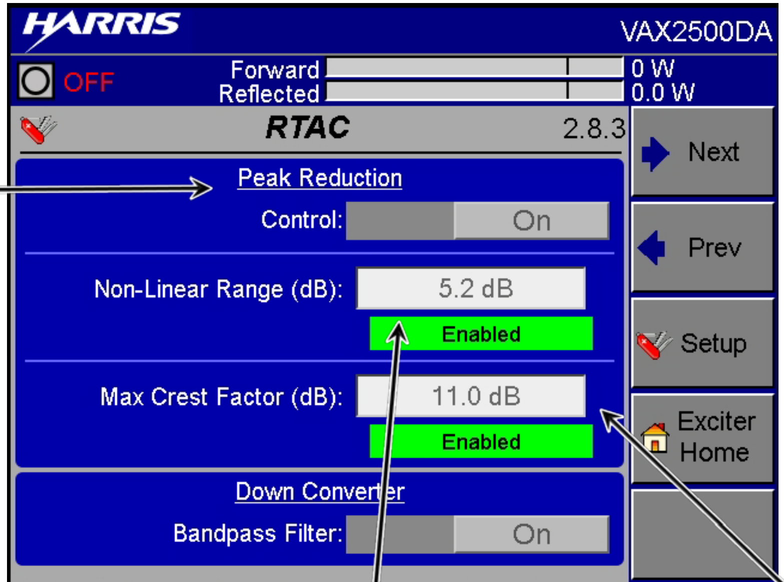
Save RTAC correction sets here,

LPU SETUP DAB DUC/RTAC

Before RTAC.

Range: 4 – 9

Range: 6 - 13



Factory Settings:

DVBT/ISDBT Non-Linear 7.8 Max Crest Factor 13.0

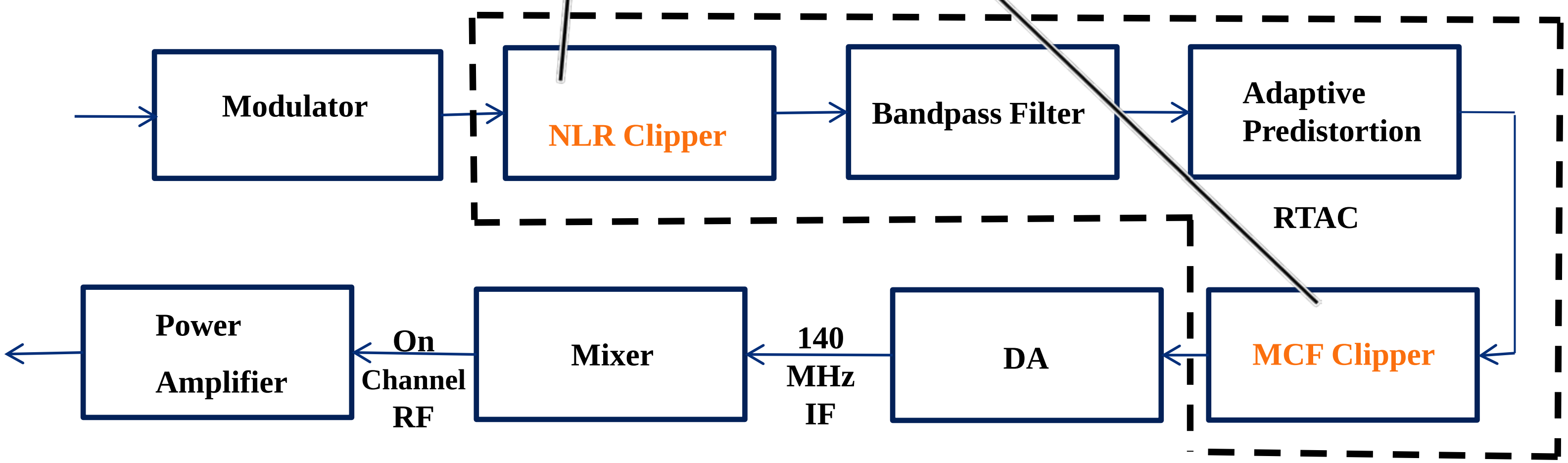
ATSC Non-Linear 7.0 Max Crest Factor 11.0

Disable Peak Reduction for Analog operation.

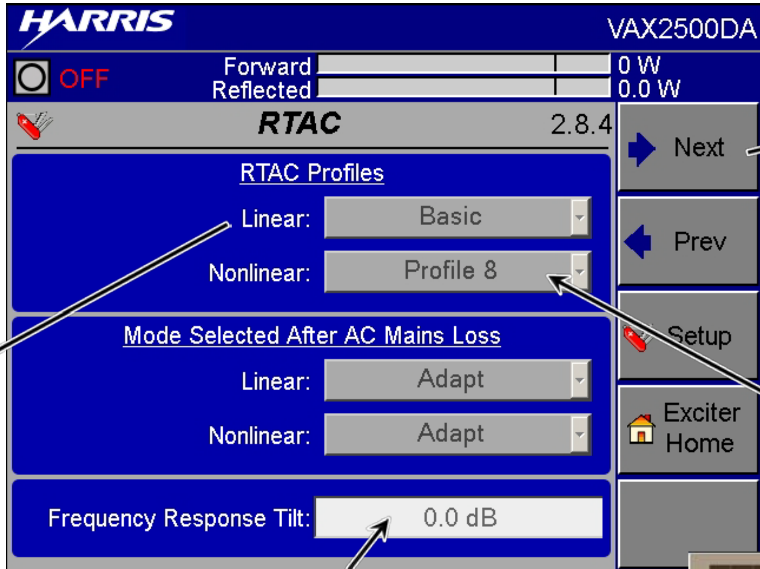
DAB: NLR = 6dB / MCF = 10dB

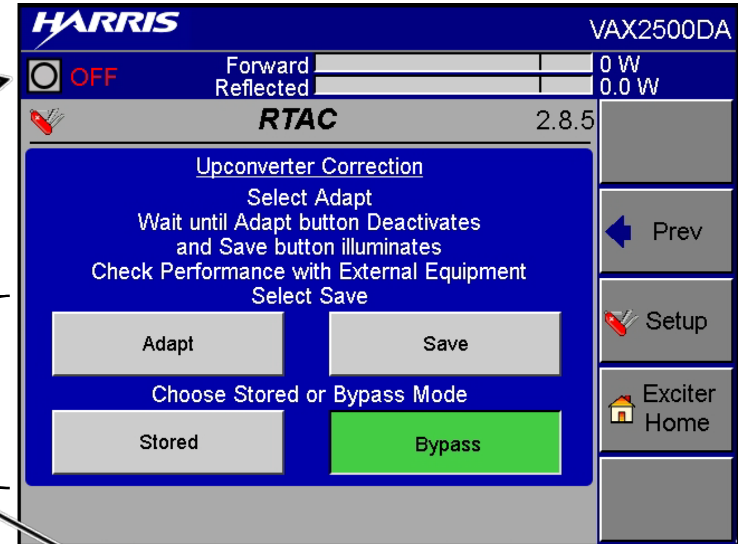
Non-Linear-Range (NLR) is a filtered clipping (→ influence to MER)

Max Crest Factor (MCF) is a overall clipping



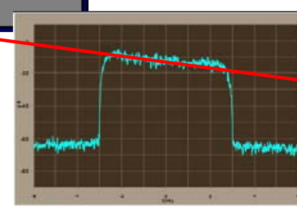
LPU SETUP DAB DUC/RTAC





Helps filter roll off at lower channels (IF=140MHz)

Corrects for down converter tilt +/- 10. Must toggle RTAC on and OFF after running for several correction cycles. Example: +9,5

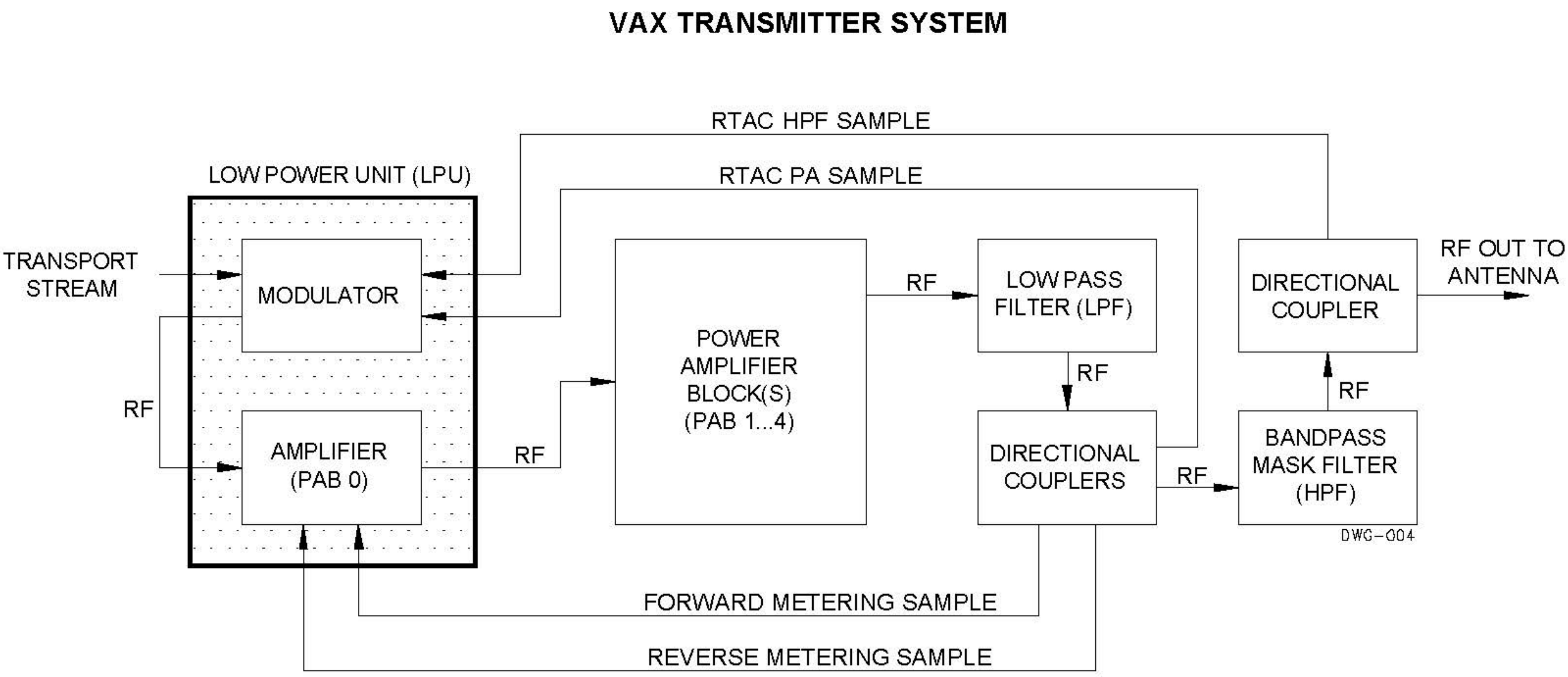


LINEAR Profiles:

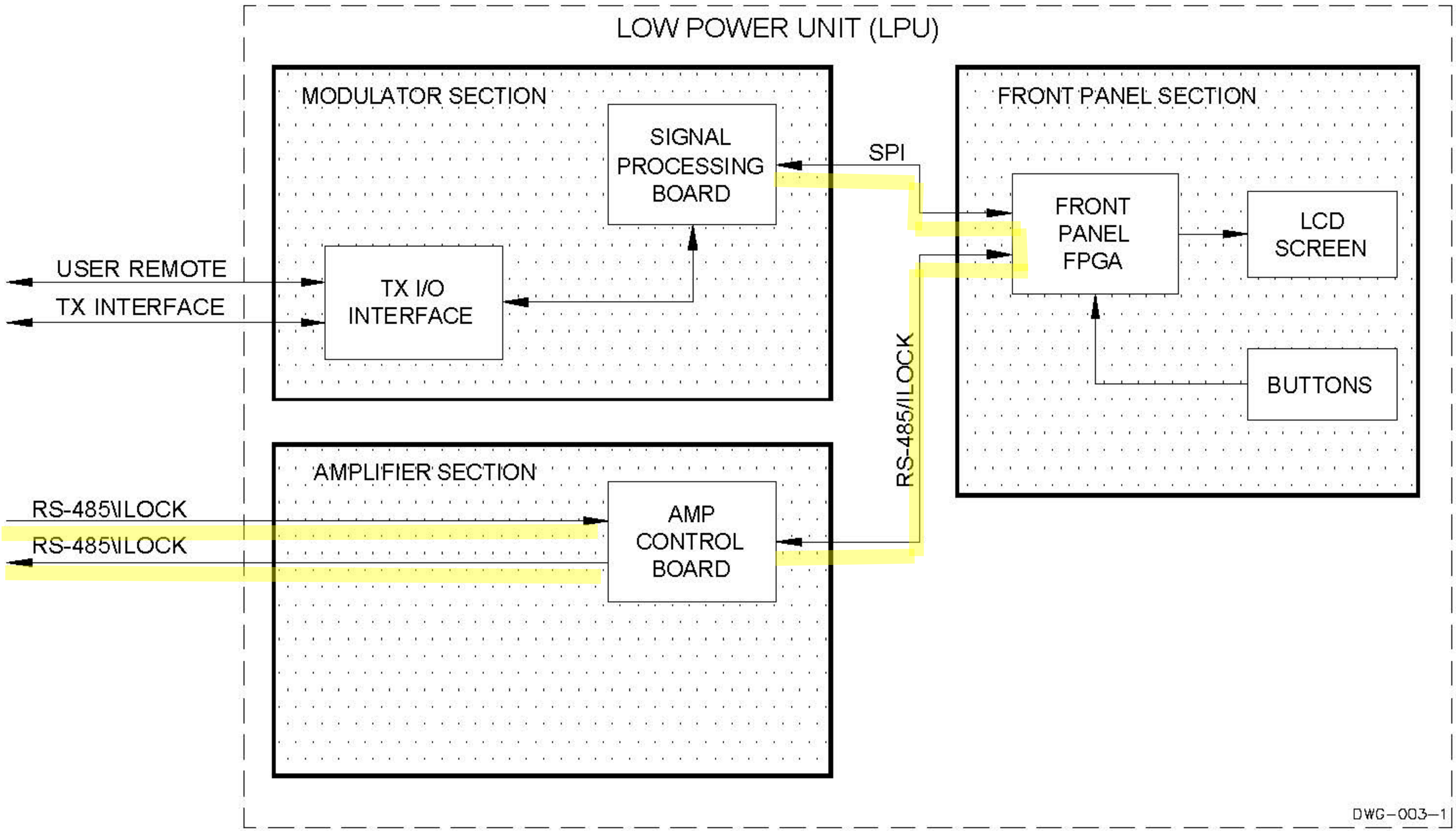
- BASIC. → most standard mask filters.
- SHORT
- LONG
- MAX
- BASIC OFFSET
- SHORT OFFSET
- LONG OFFSET → filter combining
- MAX OFFSET

NON-LINEAR Profiles:

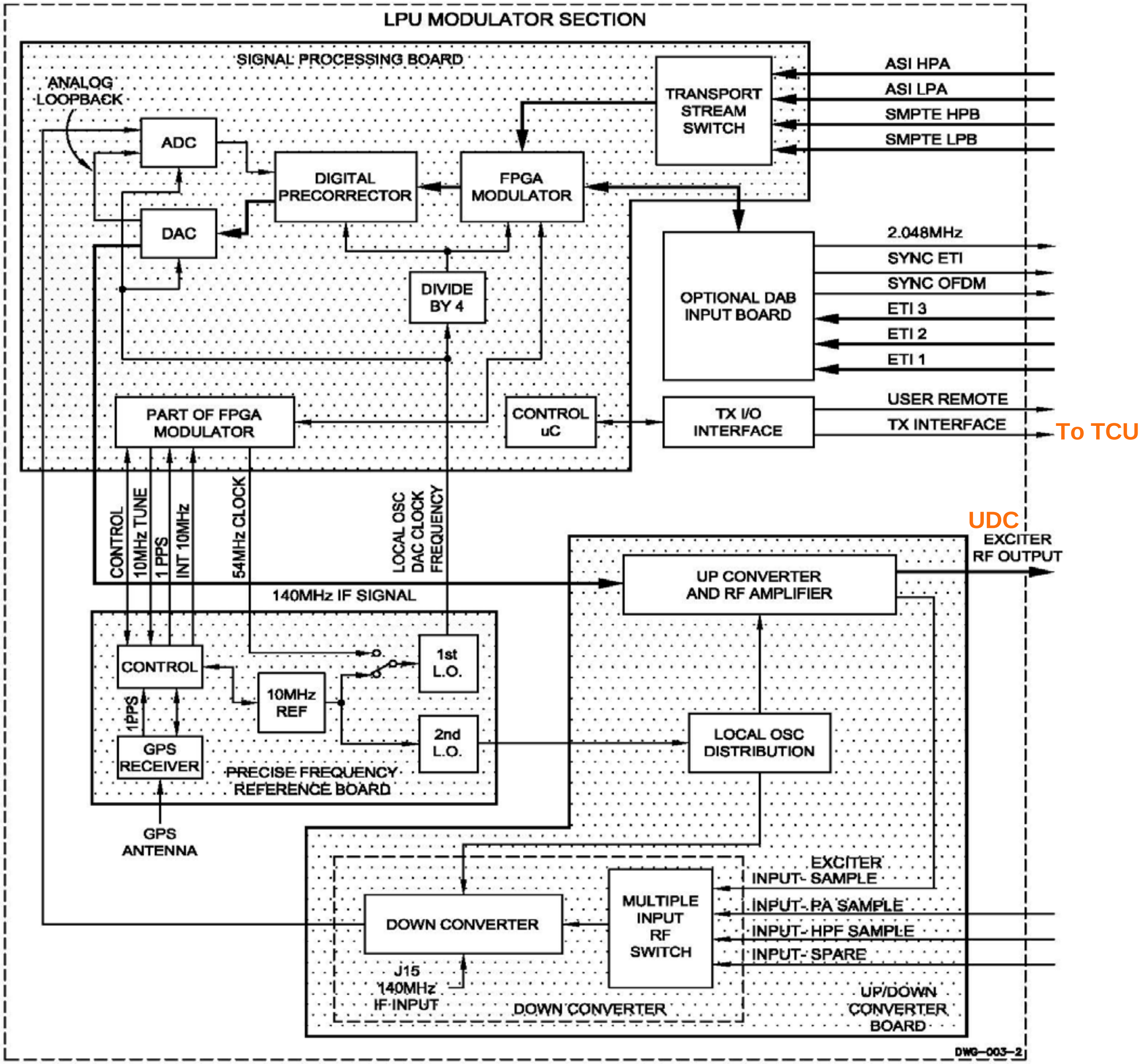
- BASIC → reflective filter
- BASIC MEMORY → reflective filter
- PROFILE 3
- PROFILE 4
- HIGH → reflective filter
- HIGH MEMORY → reflective filter
- PROFILE 7 (Avoid in DAB)
- PROFILE 8
- PROFILE 9 → in CTTB & ISDBT


VAX TRANSMITTER SYSTEM
RTAC HPF SAMPLE
RTAC PA SAMPLE
LOW POWER UNIT (LPU)
TRANSPORT STREAM
MODULATOR
RF
AMPLIFIER (PAB 0)
RF
POWER AMPLIFIER BLOCK(S) (PAB 1...4)
RF
LOW PASS FILTER (LPF)
RF
DIRECTIONAL COUPLERS
RF
DIRECTIONAL COUPLER
RF OUT TO ANTENNA
RF
BANDPASS MASK FILTER (HPF)
DWG-G04
FORWARD METERING SAMPLE
REVERSE METERING SAMPLE

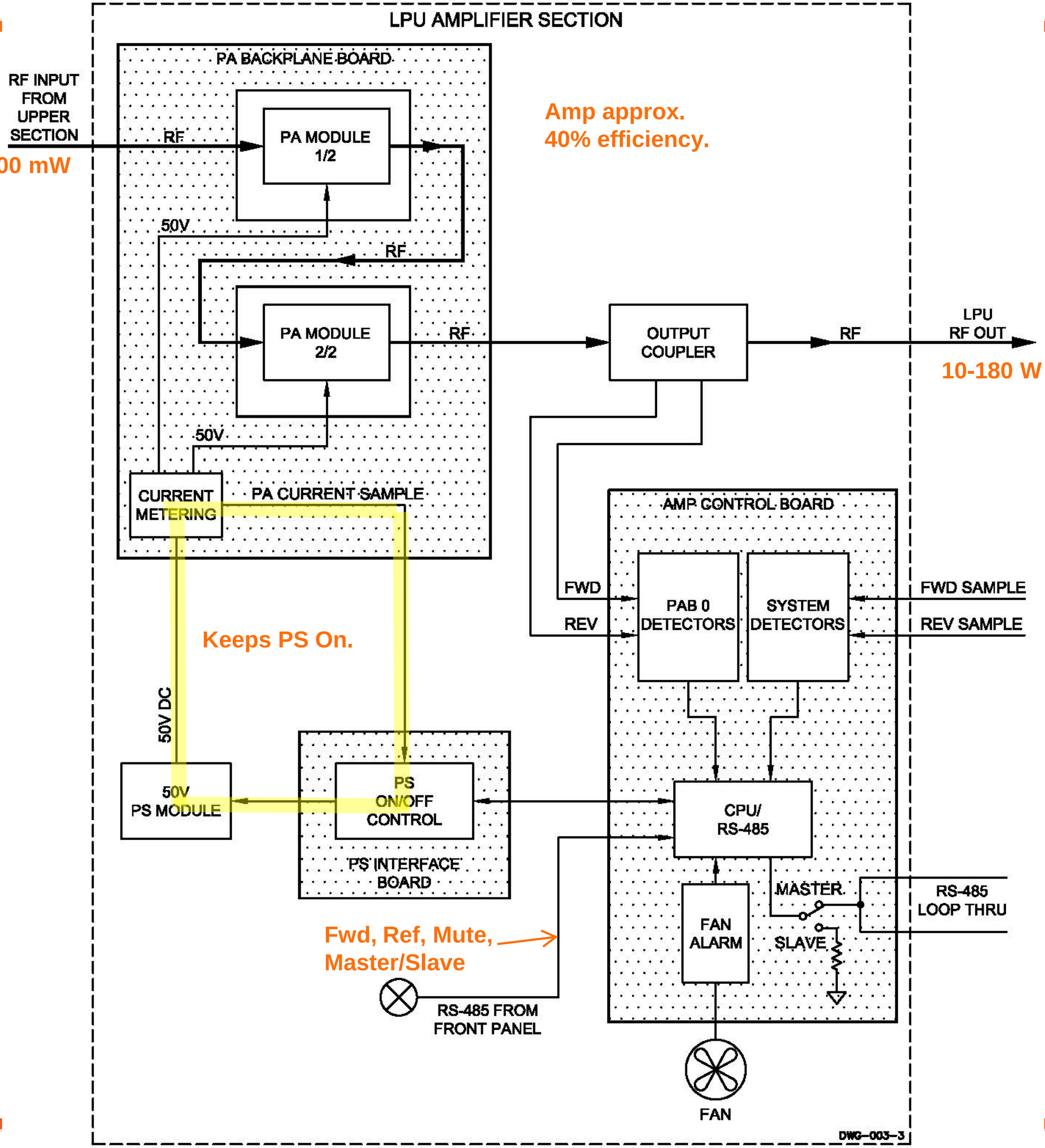
VAX LPU BLOCK



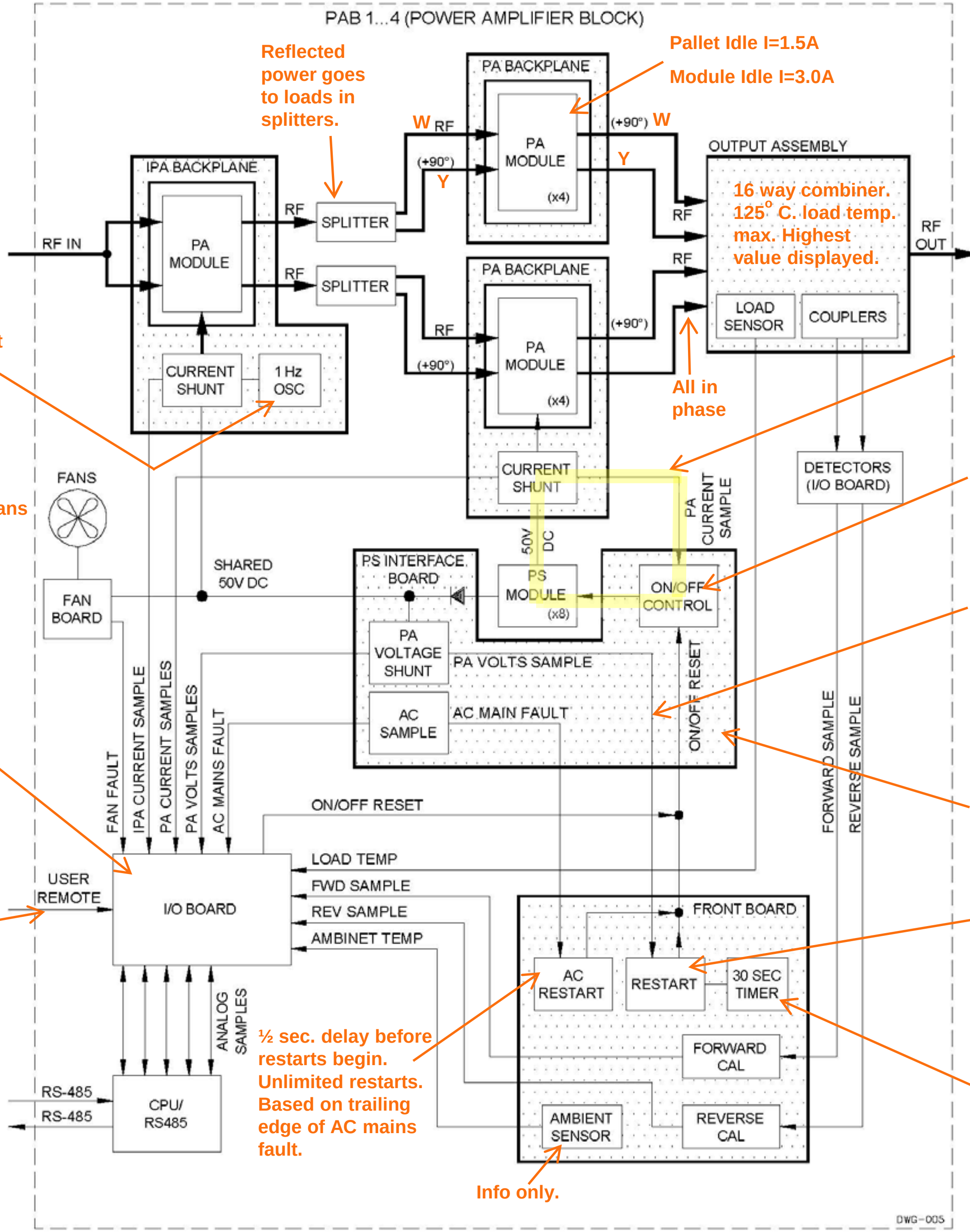
VAX LPU MODULATOR



VAX LPU AMPLIFIER



VAX PAB



Reflected power goes to loads in splitters.

Pallet Idle I=1.5A

Module Idle I=3.0A

90° offsets give Z cancellation and handle reflected power.

Alternates display between IPA current values

Loop current keeps PS on.

Comparator in each module. PA samples <1A triggers PS off.

If pulling 1 module turns off another module suspect bad reject loads.

50V fans

Transmission line arc shuts all modules off.

Diode Or'ed 50V

PS modules off but state is On = all modules unplugged.

Back of PA B above fan door.

Long board at top rear.

General restart for arcing. On cmd every 8 sec. if PS off but state on. Control light lit after 3 attemps.

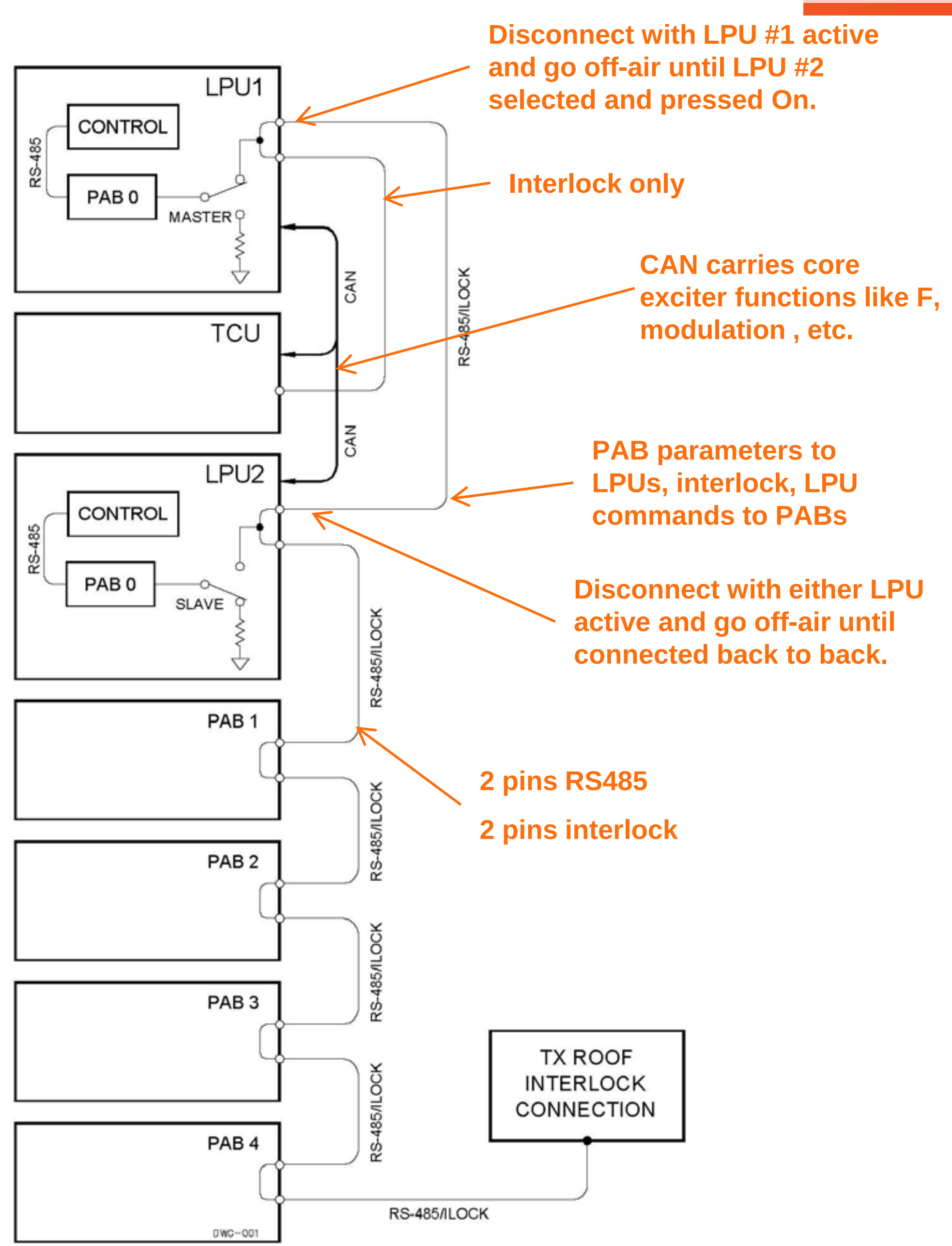
20 analog lines. Not used. Available for user remote. DB25.

On/Off state via RS485. On pulse 100 mS long.To LPU

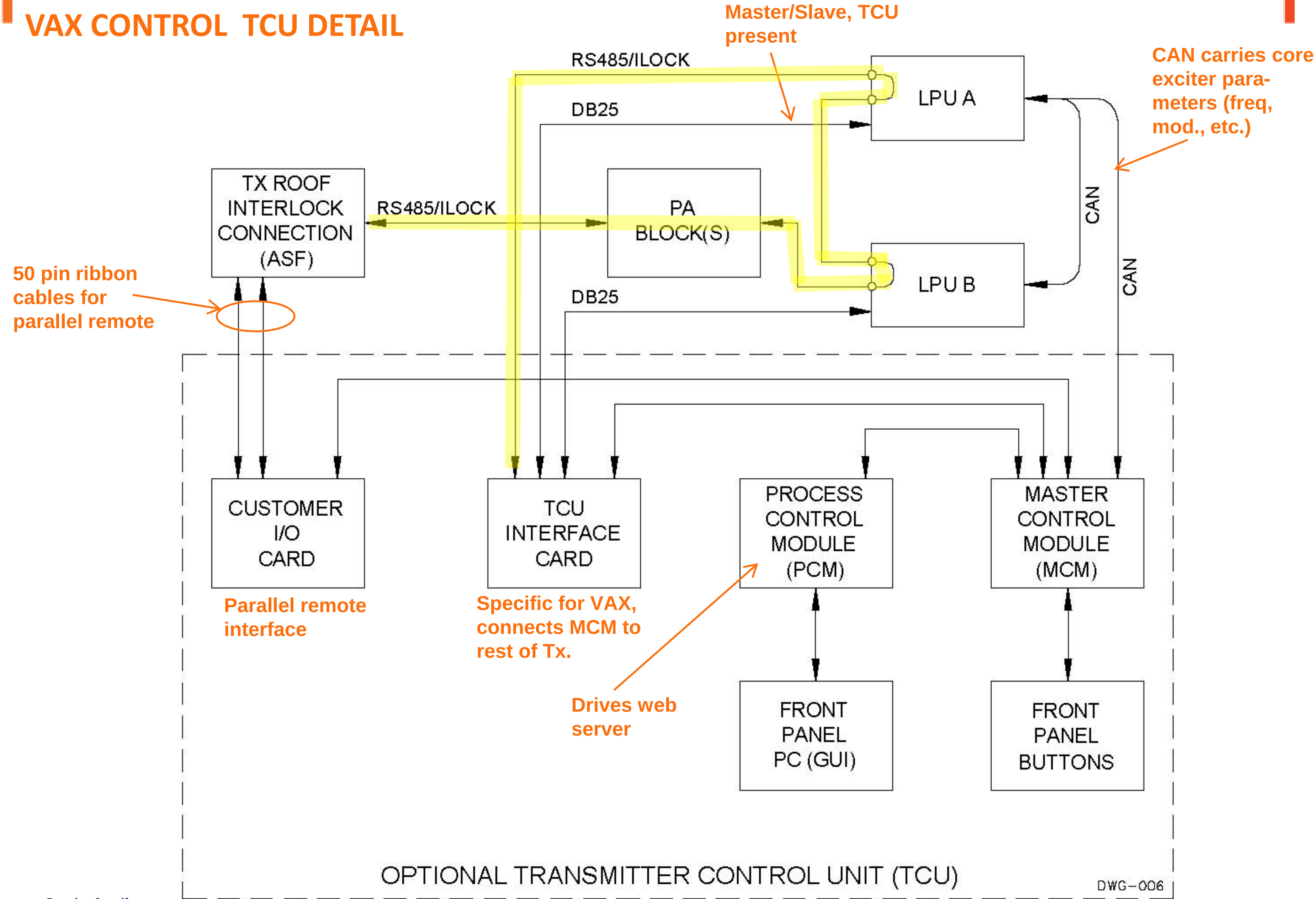
Triggered when PA block is on but 50V shared not present.

Info only.

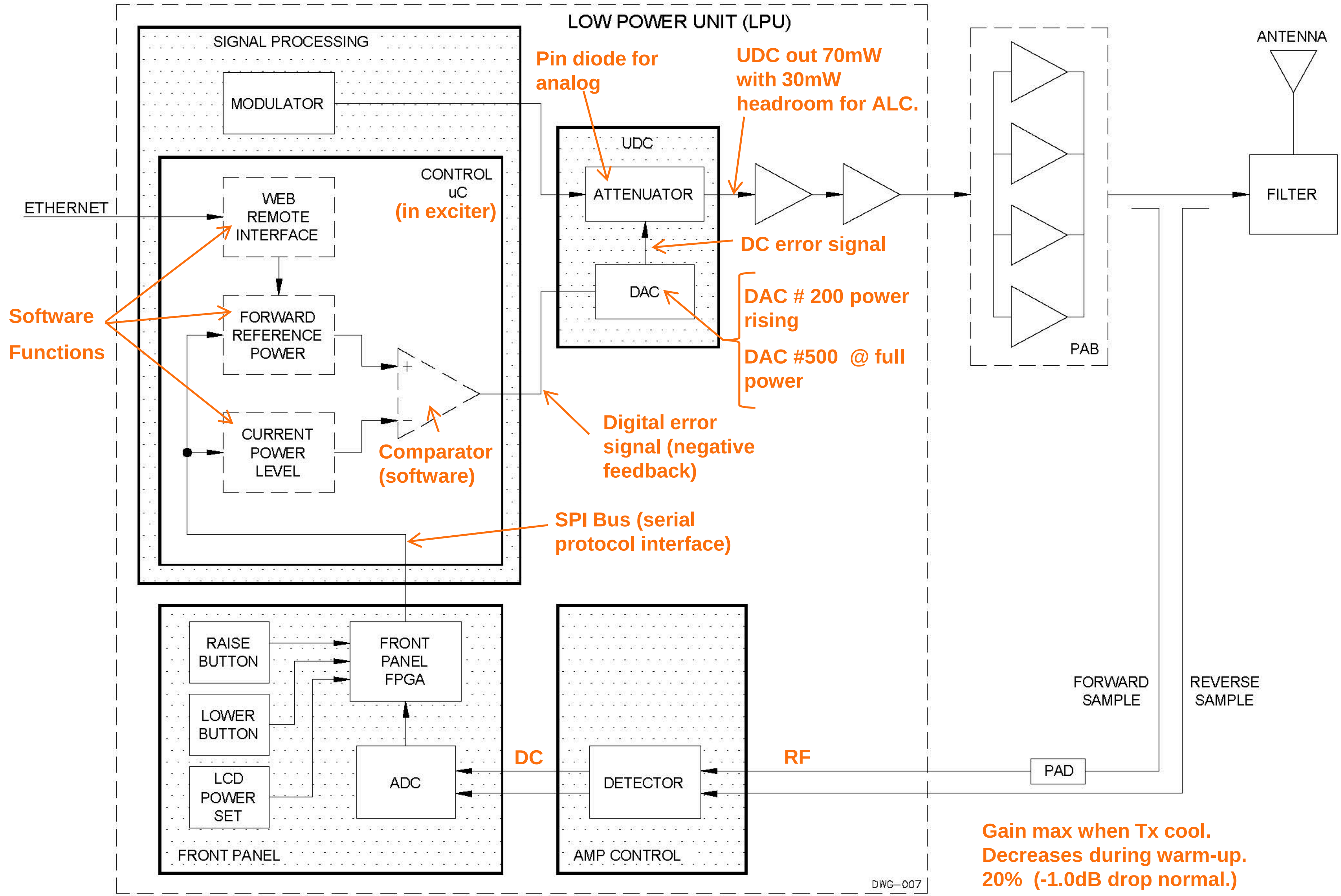
VAX CONTROL


LPU1
CONTROL
RS-485
PAB 0
MASTER
CAN
TCU
CAN
RS-485/ILOCK
LPU2
CONTROL
RS-485
PAB 0
SLAVE
PAB 1
RS-485/ILOCK
PAB 2
RS-485/ILOCK
PAB 3
RS-485/ILOCK
PAB 4
RS-485/ILOCK
TX ROOF INTERLOCK CONNECTION
RS-485/ILOCK
Disconnect with LPU #1 active and go off-air until LPU #2 selected and pressed On.
Interlock only
CAN carries core exciter functions like F, modulation , etc.
PAB parameters to LPUs, interlock, LPU commands to PABs
Disconnect with either LPU active and go off-air until connected back to back.
2 pins RS485
2 pins interlock

VAX CONTROL TCU DETAIL

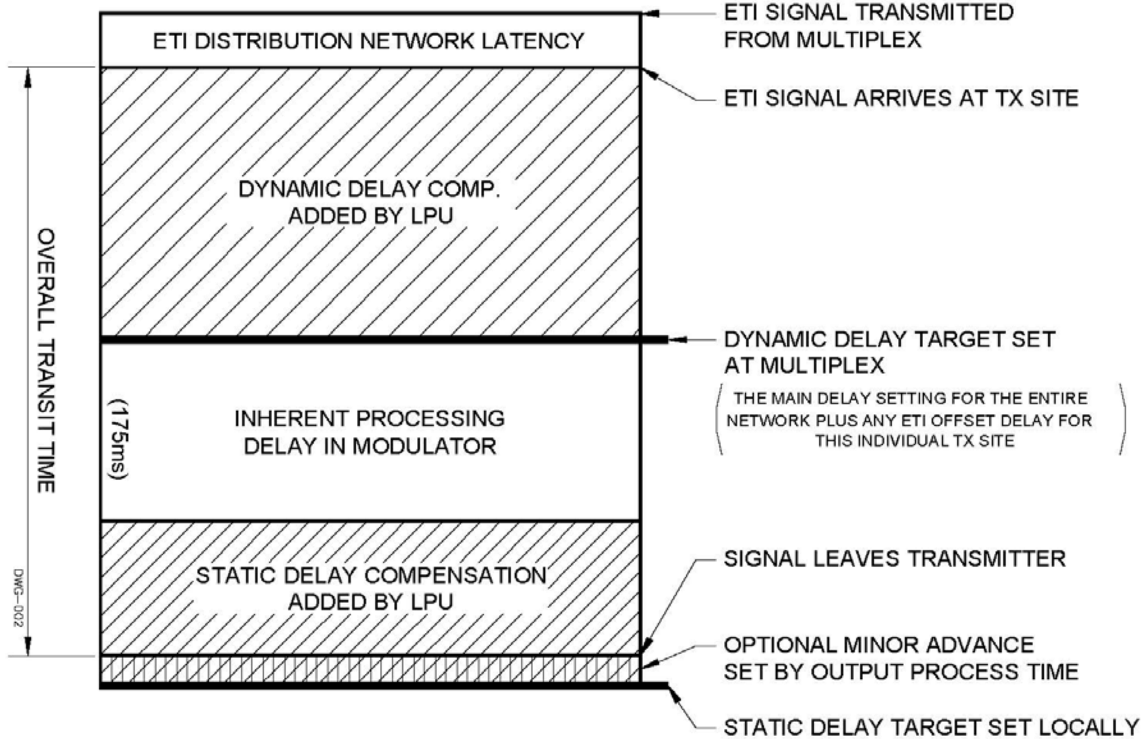


VAX TX SYSTEM (ALC DETAIL)



Drawing 7.pdf

SFN



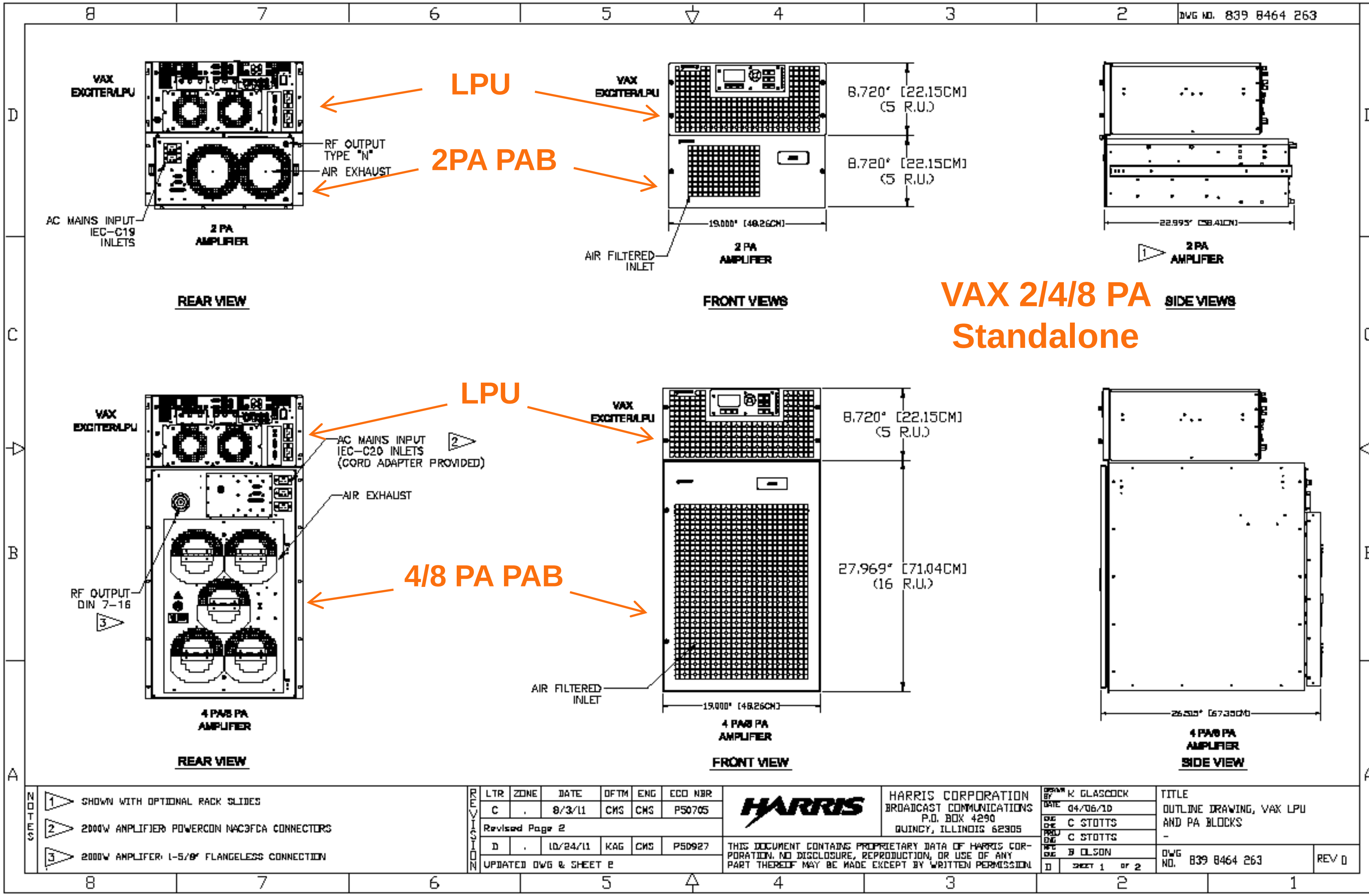
DYNAMIC DELAY COMPENSATES FOR CHANGING LATENCY IN THE ETI DISTRIBUTION NETWORK TO THE TRANSMITTER SITE.

STATIC DELAY COMPENSATES FOR DIFFERENT INTERNAL PROCESSING DELAY FOR VARIOUS EQUIPMENT TYPES. CAN ALSO BE USED TO MANUALLY SYNCHRONIZE TRANSMITTERS AND MANUALLY ADD A LOCAL OFFSET FOR SIMPLE SFN NETWORKS WITHOUT DYNAMIC DELAY ACTIVATED.

OFFSET DELAY ADDED TO AN INDIVIDUAL TRANSMITTER TO ACCOUNT FOR PARTICULAR GEOGRAPHICAL AND PROPAGATIONAL CONDITIONS. MAY BE ADDED TO THE DYNAMIC DELAY BUFFER VIA AN MSNC SETTING IN THE ETI STREAM, OR LOCALLY TO THE STATIC DELAY BUFFER VIA THE *ADJUST ETI STATIC DELAY* SETTING IN THE LPU WEB BROWSER.

Drawing 2a.pdf

Drawing 2b.pdf


DWG NO. 839 8464 263
LPU
2PA PAB
VAX EXCITER/LPU
RF OUTPUT TYPE "N"
AIR EXHAUST
AC MAINS INPUT IEC-C19 INLETS
2 PA AMPLIFIER
REAR VIEW
8.720" [22.15CM] (5 R.U.)
8.720" [22.15CM] (5 R.U.)
19.000" [48.26CM]
AIR FILTERED INLET
FRONT VIEWS
22.995" [58.41CM]
SIDE VIEWS
VAX 2/4/8 PA Standalone
AC MAINS INPUT IEC-C20 INLETS (CORD ADAPTER PROVIDED)
RF OUTPUT DIN 7-16
4/8 PA PAB
4 PA/8 PA AMPLIFIER
27.969" [71.04CM] (16 R.U.)
FRONT VIEW
SIDE VIEW
NOTES
1 SHOWN WITH OPTIONAL RACK SLIDES
2 2000W AMPLIFIER POWERCON NAC3FCA CONNECTORS
3 2000W AMPLIFER 1-5/8" FLANGELESS CONNECTION
REVISION
LTR ZONE DATE DFTM ENG ECO NBR
C . 8/3/11 CMS CMS P50705
Revised Page 2
D . 10/24/11 KAG CMS P50927
UPDATED DWG & SHEET 2
HARRIS
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DRAWN BY K GLASCOCK
DATE 04/06/10
C STOTTS
C STOTTS
B OLSON
SHEET 1 OF 2
TITLE OUTLINE DRAWING, VAX LPU AND PA BLOCKS
DWG NO. 839 8464 263
REV D

1 of 2

8	7	6	5	4	3	2	DWG NO. 839 8464 263

COMPONENTS / RF POWER / TRANSMITTER AC POWER

MODEL	# CABINETS (NOTE 1)	# PA BLOCKS	# DRIVER MODULES (NOTE 10)	# IPA MODULES	# PA MODULES	RF OUTPUT POWER (W) (NOTE 2) DIGITAL: AVERAGE POWER ANALOG: PEAK OF SYNC	RF OUTPUT INTERFACE (NOTE 3)	AC MAINS VOLTAGE (50/60 HZ)	AC POWER CONSUMPTION (W) (TYP)	MINIMUM POWER FACTOR	OVERALL EFFICIENCY	LINE CURRENT (A) (TYP/MAX) 208 VAC SINGLE PHASE (NOTE 5)
VAX100AN	1	0	0	0	1	100	N-TYPE (FEMALE)	208/240VAC SINGLE PHASE	500	0.98	20.00%	
VAX50DA						50			500	0.98	10.00%	2
VAX60AT						60			520	0.98	11.54%	2.1
VAX50DV/IS/FL/CT/CM						50			475	0.98	10.53%	
VAX250AN						250			750	0.98	33.33%	
VAX150DA						150			750	0.98	20.00%	2.6
VAX180AT						180			850	0.98	21.18%	2.7
VAX100DV/IS/FL/CT/CM						100			600	0.98	16.67%	
VAX500AN		1	1		2	500		208/240 VAC THREE PHASE, DELTA 380/415 VAC THREE PHASE, WYE	1500	0.98	33.33%	
VAX300DA						300			1500	0.98	20.00%	
VAX375AT						375			1700	0.98	22.06%	
VAX200DV/IS/FL/CT/CM						200			950	0.98	21.05%	
VAX1000AN						1000			2500	0.98	40.00%	
VAX600DA						600			2500	0.98	24.00%	
VAX750AT						750			2800	0.98	26.79%	
VAX400DV/IS/FL/CT/CM						400			1750	0.98	22.86%	
VAX2000AN					4	2000	1-5/8" EIA, UN-FLANGED		5000	0.98	40.00%	
VAX1250DA						1250			5000	0.98	25.00%	
VAX1500AT						1500			5600	0.98	26.79%	
VAX800DV/IS/FL/CT/CM						800			3500	0.98	22.86%	
VAX4000AN				1	8	4000			9200	0.98	43.48%	
VAX2500DA						2500			9200	0.98	27.17%	
VAX3000AT						3000			9800	0.98	30.61%	
VAX1600DV/IS/FL/CT/CM						1600			7000	0.98	22.86%	
VAX8000AN	2	2		2	16	8000			18000	0.98	44.44%	
VAX5000DA						5000			18000	0.98	27.78%	
VAX6000AT						6000			19600	0.98	30.61%	
VAX3200DV/IS/FL/CT/CM						3200			14000	0.98	22.86%	
VAX12000AN		3		3	24	12000	3-1/8" EIA FLANGED		27000	0.98	44.44%	
VAX7500DA						7500			27000	0.98	27.78%	
VAX9000AT						8000			29400	0.98	27.21%	
VAX4800DV/IS/FL/CT/CM						4800			20750	0.98	23.13%	
VAX16000AN		4		4	32	16000			36000	0.98	44.44%	
VAX10000DA						10000			36000	0.98	27.78%	
VAX12000AT						12000			39200	0.98	30.61%	
VAX6400DV/IS/FL/CT/CM						6400			27500	0.98	23.27%	

TRANSMITTER AC POWER (cont.) / AMBIENT AIR / MISC

MODEL	LINE CURRENTS (A) (TYP) 208 VAC THREE PHASE DELTA (NOTE 5)	LINE CURRENTS (A) (TYP) 380 VAC THREE PHASE WYE (NOTE 5)	RECOMMENDED BREAKER (A) 208 VAC THREE PHASE DELTA	RECOMMENDED BREAKER (A) 380 VAC THREE PHASE WYE	MINIMUM COPPER WIRE 92E(mm2) DELTA	MINIMUM COPPER WIRE 92E(mm2) WYE	OPERATING AMBIENT TEMPERATURE RANGE	AIR FLOW (m3/min) Cabinet 1/Cabinet 2	EXHAUST TEMP RISE (C)	TYP HEAT LOAD TO ROOM (W) (NOTE 4,6)	TRANSMITTER WEIGHT (KG) (NOTE 4,6)	FOOTPRINT SQM (SQFT) (NOTE 4)	SOUND LEVEL (dBA) (NOTE 4,8,9)
VAX100AN					1.5	1.5	0-45 DEGREES C	3	8	400	20	1.2[12.2]	<65
VAX50DA					1.5	1.5				450			
VAX60AT					1.5	1.5				460			
VAX50DV/IS/FL/CT/CM					1.5	1.5				400			
VAX250AN					1.5	1.5		3	12	500	20		<65
VAX150DA					1.5	1.5				600			
VAX180AT					1.5	1.5				670			
VAX100DV/IS/FL/CT/CM					1.5	1.5				500			
VAX500AN	3.5	2.2	20	20	2.5	2.5		7	10	1000	256.5		<65 with front door
VAX300DA	3.5	2.2	20	20	2.5	2.5				1200			
VAX375AT	3.6	2.5	20	20	2.5	2.5				1325			
VAX200DV/IS/FL/CT/CM	3	2	20	20	2.5	2.5				750			
VAX1000AN	6	4	20	20	2.5	2.5			15	1500			<65 with front door
VAX600DA	6	4	20	20	2.5	2.5				1900			
VAX750AT	6.5	4.8	20	20	2.5	2.5				2050			
VAX400DV/IS/FL/CT/CM	5.5	4	20	20	2.5	2.5				1350			
VAX2000AN	12	8	32	20	6	2.5		19	19	3000	286.5		<65 with front door
VAX1250DA	12	8	32	20	6	2.5				3750			
VAX1500AT	13	9	32	20	6	2.5				4100			
VAX800DV/IS/FL/CT/CM	11	7	32	20	6	2.5				2700			
VAX4000AN	22	14	50	32	10	6		19	19	5200	316.5		<65 with front door
VAX2500DA	22	14	50	32	10	6				6700			
VAX3000AT	25	15	50	32	10	6				6800			
VAX1600DV/IS/FL/CT/CM	20	13	50	32	10	6				5400			
VAX8000AN	43	27	85	50	25	10		38	19	10000	580	2.3[24.4]	<65 with front door
VAX5000DA	43	27	85	50	25	10				13000			
VAX6000AT	45	29	85	50	25	10				13600			
VAX3200DV/IS/FL/CT/CM	40	25	85	50	25	10				10800			
VAX12000AN	43/21	26/14	85/50	50/32	25/10	10/6		57	19	15000	658		<65 with front door
VAX7500DA	43/21	26/14	85/50	50/32	25/10	10/6				19500			
VAX9000AT	45/23	28/17	85/50	50/32	25/10	10/6				21400			
VAX4800DV/IS/FL/CT/CM	40/20	25/13	85/50	50/32	25/10	10/6				15950			
VAX16000AN	42/42	26/26	85/85	50/50	25/25	10/10		76	19	20000	753		<65 with front door
VAX10000DA	42/42	26/26	85/85	50/50	25/25	10/10				26000			
VAX12000AT	45/45	26/26	85/85	50/50	25/25	10/10				27200			
VAX6400DV/IS/FL/CT/CM	40/40	24/24	85/85	50/50	25/25	10/10				21100			

NOTE 1 NUMBER BASED ON DUAL LPU SYSTEMS WITH TCU
NOTE 2 BEFORE BANDPASS FILTER
NOTE 3 FINAL TRANSMITTER OUTPUT LINE SIZE
NOTE 4 DOES NOT INCLUDE OPTIONAL EQUIPMENT
NOTE 5 ANALOG: TYP CURRENT @ 50% APL, MAX CURRENT @ 0% APL
NOTE 6 ANALOG: TYP READINGS @ 50% APL
ANALOG & DIGITAL: XMTR RF PWR TO ANTENNA
NOTE 7 ANALOG: MAX READINGS @ % APL
ANALOG & DIGITAL: XMTR RF POWER TO AIR COOLED STATION TEST LOAD IN XMTR ROOM

NOTE 8 MEASURED 1 METER FROM FRONT CENTER OF TRANSMITTER
NOTE 9 NUMBER BASED ON DUAL LPU SYSTEMS WITH TCU, IN A RACK
NOTE 10 SINGLE LPU SYSTEM, DUAL LPU SYSTEM WILL HAVE TWICE THE NUMBER
NOTE 11 16 PA DUAL DRIVE, 24 PA AND 32 PA SYSTEMS REQUIRE 2 RACKS

NOTES

REVISION

LTR	ZONE	DATE	DFTM	ENG	ECO NBR
C	.	8/3/11	CHS	CHS	P50705
Revised Table					
D	.	10/24/11	KAG	CMS	P50927
UPDATED EXCEL WORKSHEET					

HARRIS

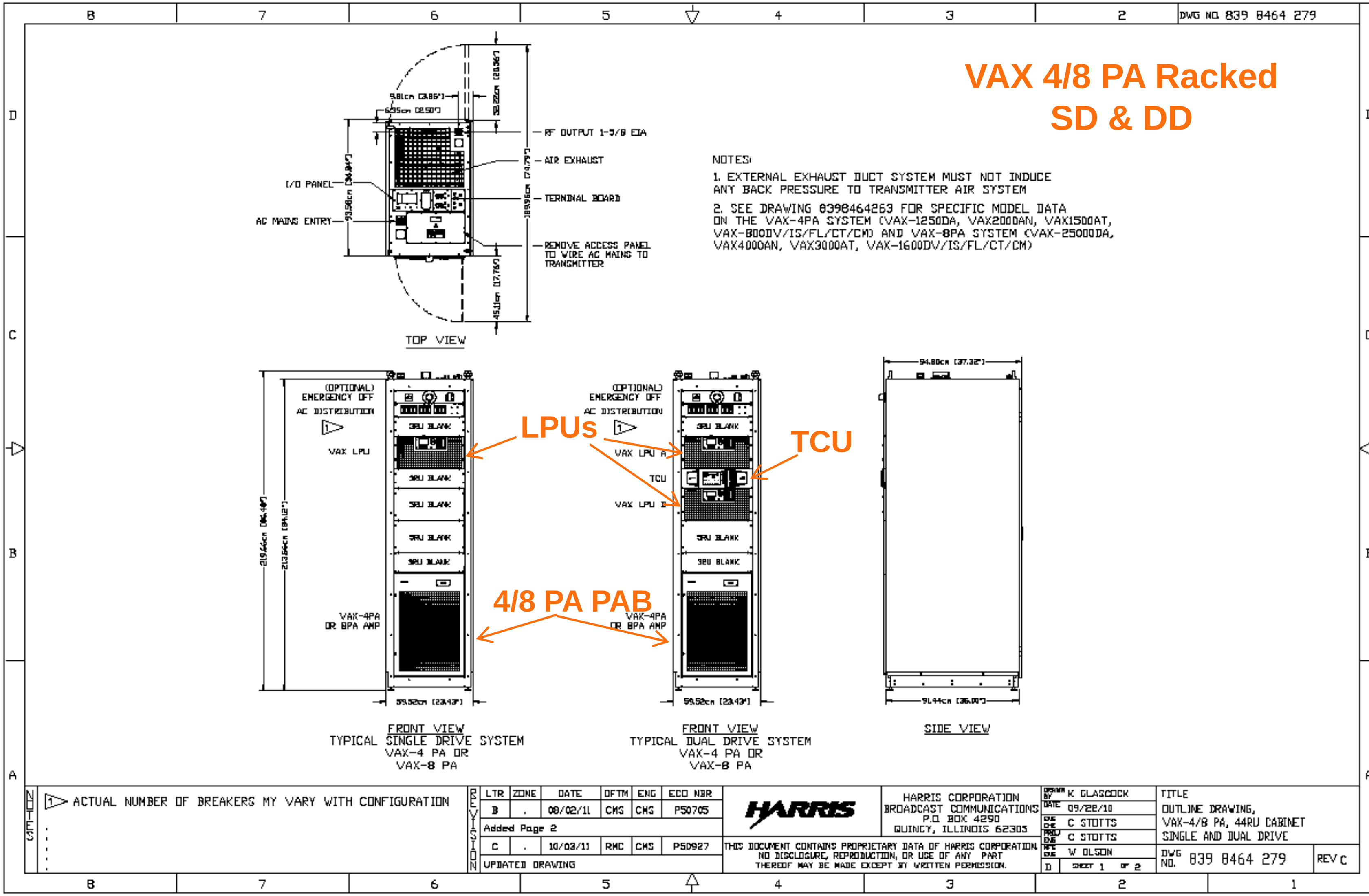
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QUINCY, ILLINOIS 62305

DRAWN BY	K GLASCOCK
DATE	04/06/10
DWG CHE	C STOTTS
PROJ ENG	C STOTTS
MFG ENG	B OLSON
D	SHEET 2 OF 2

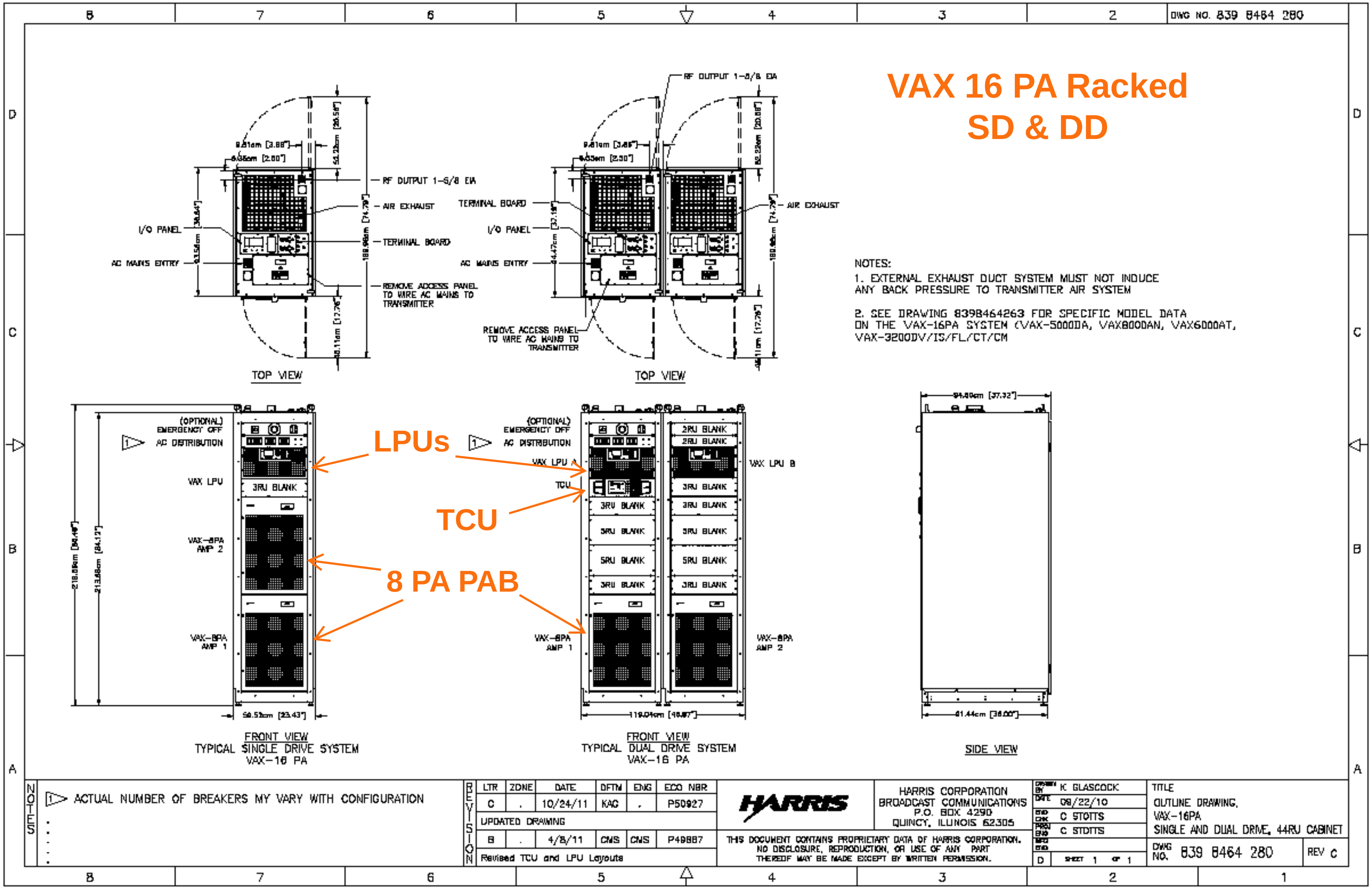
TITLE
OUTLINE DRAWING, VAX MODEL DATA
-
-

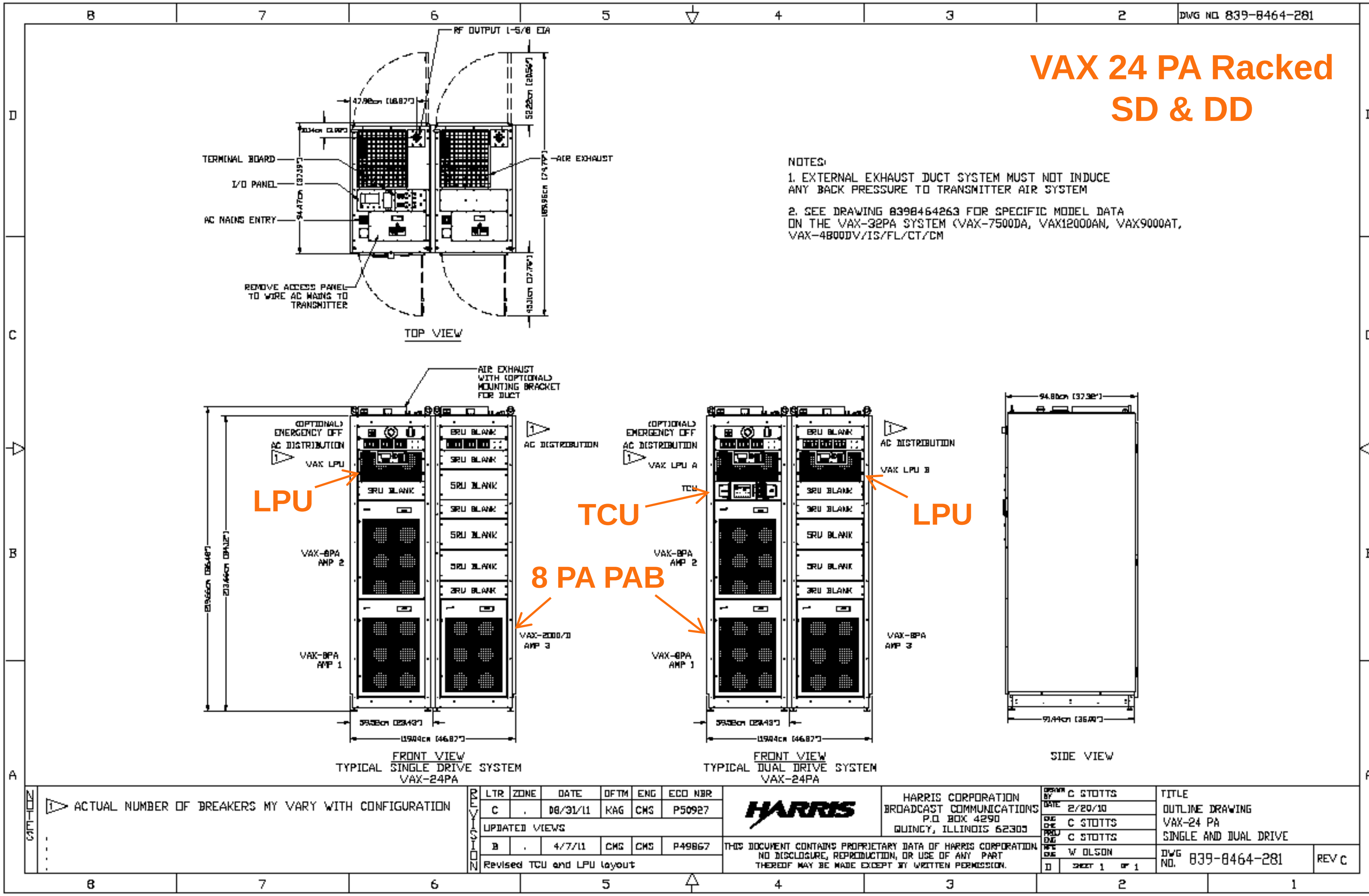
DWG NO. 839 8464 263 REV D

8	7	6	5	4	3	2	1


DWG NO. 839 8464 279
VAX 4/8 PA Racked
SD & DD
RF OUTPUT 1-5/8 EIA
AIR EXHAUST
I/O PANEL
TERMINAL BOARD
AC MAINS ENTRY
REMOVE ACCESS PANEL TO WIRE AC MAINS TO TRANSMITTER
TOP VIEW
NOTES:
1. EXTERNAL EXHAUST DUCT SYSTEM MUST NOT INDUCE ANY BACK PRESSURE TO TRANSMITTER AIR SYSTEM
2. SEE DRAWING 8398464263 FOR SPECIFIC MODEL DATA ON THE VAX-4PA SYSTEM (VAX-1250DA, VAX2000AN, VAX1500AT, VAX-800DV/IS/FL/CT/CM) AND VAX-8PA SYSTEM (VAX-2500DA, VAX4000AN, VAX3000AT, VAX-1600DV/IS/FL/CT/CM)
(OPTIONAL) EMERGENCY OFF
AC DISTRIBUTION
VAX LPU
LPUs
VAX LPU A
TCU
VAX LPU B
3RU BLANK
VAX-4PA OR 8PA AMP
4/8 PA PAB
59.52cm [23.43"]
94.80cm [37.32"]
91.44cm [36.00"]
FRONT VIEW
TYPICAL SINGLE DRIVE SYSTEM
VAX-4 PA OR
VAX-8 PA
FRONT VIEW
TYPICAL DUAL DRIVE SYSTEM
VAX-4 PA OR
VAX-8 PA
SIDE VIEW
1 ACTUAL NUMBER OF BREAKERS MY VARY WITH CONFIGURATION
LTR | ZONE | DATE | DFTM | ENG | ECO NBR
B | . | 08/02/11 | CMS | CMS | P50705
Added Page 2
C | . | 10/03/11 | RMC | CMS | P50927
UPDATED DRAWING
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K GLASCOCK
09/22/10
C STOTTS
C STOTTS
W OLSON
TITLE
OUTLINE DRAWING,
VAX-4/8 PA, 44RU CABINET
SINGLE AND DUAL DRIVE
DWG NO. 839 8464 279
REV C

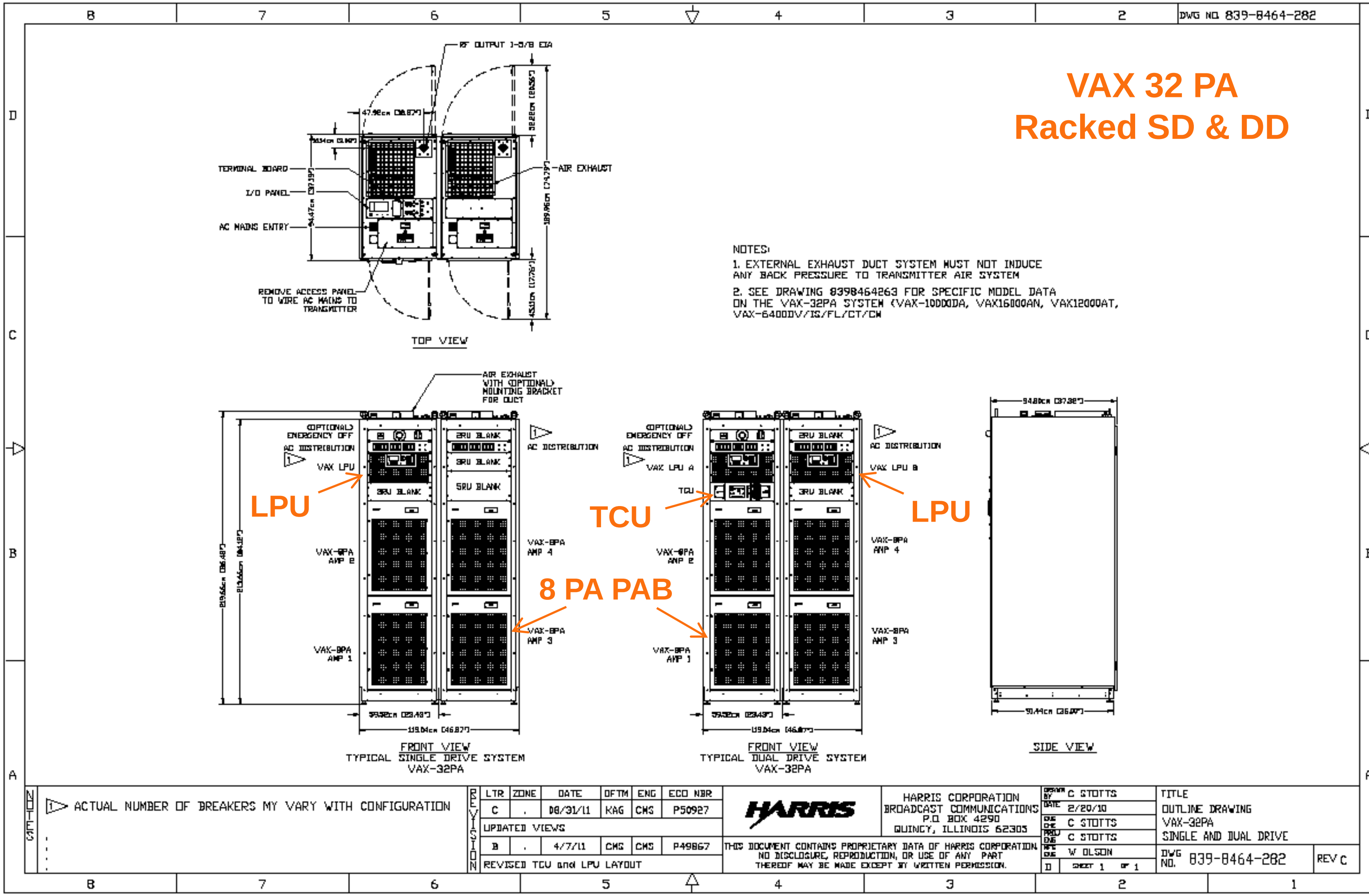
1 of 1


VAX 16 PA Racked
SD & DD
LPUs
TCU
8 PA PAB
TOP VIEW
FRONT VIEW
TYPICAL SINGLE DRIVE SYSTEM
VAX-16 PA
FRONT VIEW
TYPICAL DUAL DRIVE SYSTEM
VAX-16 PA
SIDE VIEW
NOTES:
1. EXTERNAL EXHAUST DUCT SYSTEM MUST NOT INDUCE ANY BACK PRESSURE TO TRANSMITTER AIR SYSTEM
2. SEE DRAWING 8398464263 FOR SPECIFIC MODEL DATA ON THE VAX-16PA SYSTEM (VAX-5000DA, VAX8000AN, VAX6000AT, VAX-3200DV/IS/FL/CT/CM
ACTUAL NUMBER OF BREAKERS MY VARY WITH CONFIGURATION
HARRIS CORPORATION
BROADCAST COMMUNICATIONS
P.O. BOX 4290
QUINCY, ILLINOIS 62305
OUTLINE DRAWING, VAX-16PA SINGLE AND DUAL DRIVE, 44RU CABINET
DWG NO. 839 8464 280
REV C

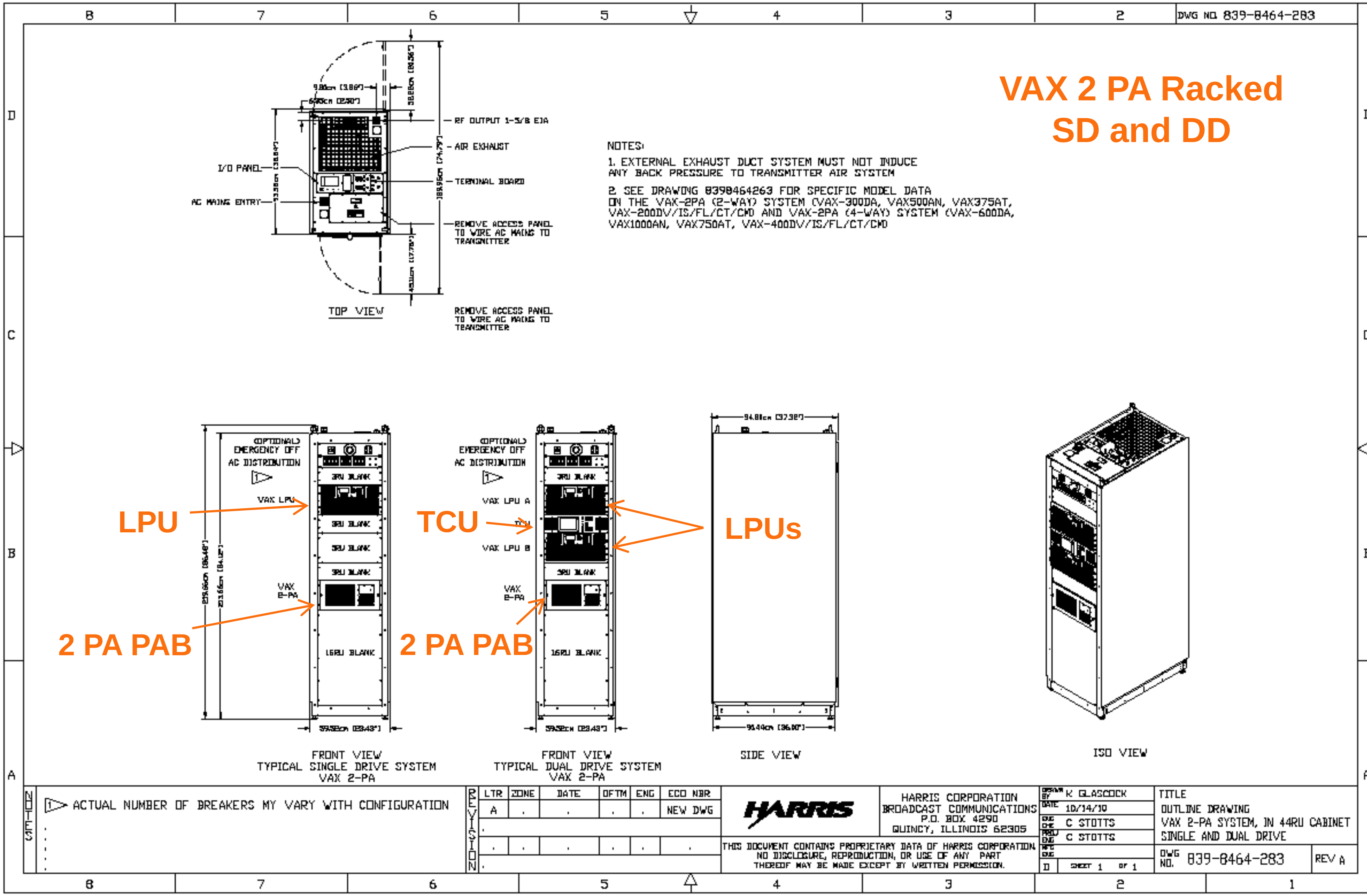


DWG NO. 839-8464-281
VAX 24 PA Racked SD & DD
RF OUTPUT 1-5/8 EIA
TERMINAL BOARD
I/O PANEL
AC MAINS ENTRY
AIR EXHAUST
REMOVE ACCESS PANEL TO WIRE AC MAINS TO TRANSMITTER
TOP VIEW
NOTES:
1. EXTERNAL EXHAUST DUCT SYSTEM MUST NOT INDUCE ANY BACK PRESSURE TO TRANSMITTER AIR SYSTEM
2. SEE DRAWING 8398464263 FOR SPECIFIC MODEL DATA ON THE VAX-32PA SYSTEM (VAX-7500DA, VAX12000AN, VAX9000AT, VAX-4800DV/IS/FL/CT/CM
AIR EXHAUST WITH (OPTIONAL) MOUNTING BRACKET FOR DUCT
(OPTIONAL) EMERGENCY OFF
AC DISTRIBUTION
VAX LPU
LPU
TCU
8 PA PAB
SRU BLANK
VAX-8PA AMP 2
VAX-8PA AMP 1
VAX-2000/D AMP 3
VAX LPU A
VAX LPU B
VAX-8PA AMP 3
FRONT VIEW
TYPICAL SINGLE DRIVE SYSTEM
VAX-24PA
FRONT VIEW
TYPICAL DUAL DRIVE SYSTEM
VAX-24PA
SIDE VIEW
ACTUAL NUMBER OF BREAKERS MY VARY WITH CONFIGURATION
LTR | ZONE | DATE | DFTM | ENG | ECO NBR
C | . | 08/31/11 | KAG | CMS | P50927
UPDATED VIEWS
B | . | 4/7/11 | CMS | CMS | P49867
Revised TCU and LPU layout
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C STOTTS
2/20/10
C STOTTS
C STOTTS
W OLSON
SHEET 1 OF 1
TITLE
OUTLINE DRAWING
VAX-24 PA
SINGLE AND DUAL DRIVE
DWG NO. 839-8464-281
REV C

1 of 1


VAX 32 PA
Racked SD & DD
RF OUTPUT 1-5/8 EIA
TERMINAL BOARD
I/O PANEL
AC MAINS ENTRY
AIR EXHAUST
REMOVE ACCESS PANEL TO WIRE AC MAINS TO TRANSMITTER
TOP VIEW
NOTES:
1. EXTERNAL EXHAUST DUCT SYSTEM MUST NOT INDUCE ANY BACK PRESSURE TO TRANSMITTER AIR SYSTEM
2. SEE DRAWING 8398464263 FOR SPECIFIC MODEL DATA ON THE VAX-32PA SYSTEM (VAX-10000DA, VAX16000AN, VAX12000AT, VAX-6400DV/IS/FL/CT/CM
AIR EXHAUST WITH (OPTIONAL) MOUNTING BRACKET FOR DUCT
(OPTIONAL) EMERGENCY OFF
AC DISTRIBUTION
VAX LPU
LPU
TCU
8 PA PAB
VAX-8PA AMP 1
VAX-8PA AMP 2
VAX-8PA AMP 3
VAX-8PA AMP 4
VAX LPU A
VAX LPU B
FRONT VIEW
TYPICAL SINGLE DRIVE SYSTEM
VAX-32PA
FRONT VIEW
TYPICAL DUAL DRIVE SYSTEM
VAX-32PA
SIDE VIEW
ACTUAL NUMBER OF BREAKERS MY VARY WITH CONFIGURATION
UPDATED VIEWS
REVISED TCU and LPU LAYOUT
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TITLE
OUTLINE DRAWING
VAX-32PA
SINGLE AND DUAL DRIVE
DWG NO. 839-8464-282
REV C

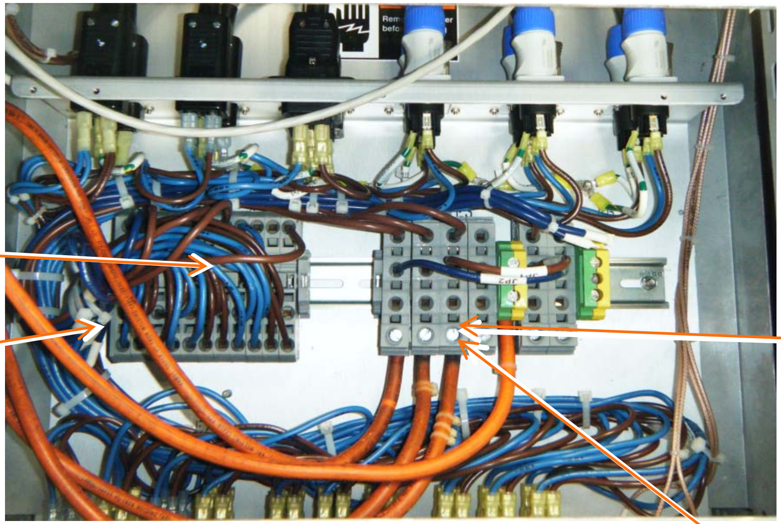
1 of 1


VAX 2 PA Racked
SD and DD
NOTES:
1. EXTERNAL EXHAUST DUCT SYSTEM MUST NOT INDUCE ANY BACK PRESSURE TO TRANSMITTER AIR SYSTEM
2. SEE DRAWING 8398464263 FOR SPECIFIC MODEL DATA ON THE VAX-2PA (2-WAY) SYSTEM (VAX-300DA, VAX500AN, VAX375AT, VAX-200DV/IS/FL/CT/CM) AND VAX-2PA (4-WAY) SYSTEM (VAX-600DA, VAX1000AN, VAX750AT, VAX-400DV/IS/FL/CT/CM)
TOP VIEW
RF OUTPUT 1-5/8 EIA
AIR EXHAUST
TERMINAL BOARD
I/O PANEL
AC MAINS ENTRY
REMOVE ACCESS PANEL TO WIRE AC MAINS TO TRANSMITTER
LPU
TCU
LPUs
2 PA PAB
2 PA PAB
(OPTIONAL) EMERGENCY OFF AC DISTRIBUTION
VAX LPU
VAX LPU A
VAX LPU B
3RU BLANK
16RU BLANK
VAX 2-PA
FRONT VIEW TYPICAL SINGLE DRIVE SYSTEM VAX 2-PA
FRONT VIEW TYPICAL DUAL DRIVE SYSTEM VAX 2-PA
SIDE VIEW
ISO VIEW
ACTUAL NUMBER OF BREAKERS MY VARY WITH CONFIGURATION
LTR A ZONE DATE DFTM ENG ECO NBR NEW DWG
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K GLASCOCK 10/14/10 C STOTTS C STOTTS
TITLE OUTLINE DRAWING VAX 2-PA SYSTEM, IN 44RU CABINET SINGLE AND DUAL DRIVE
DWG NO. 839-8464-283 REV A
SHEET 1 OF 1

1 of 1

AC DISTRIBUTION PANEL CONNECTION (TOP OF CABINET)

Access panel removed.

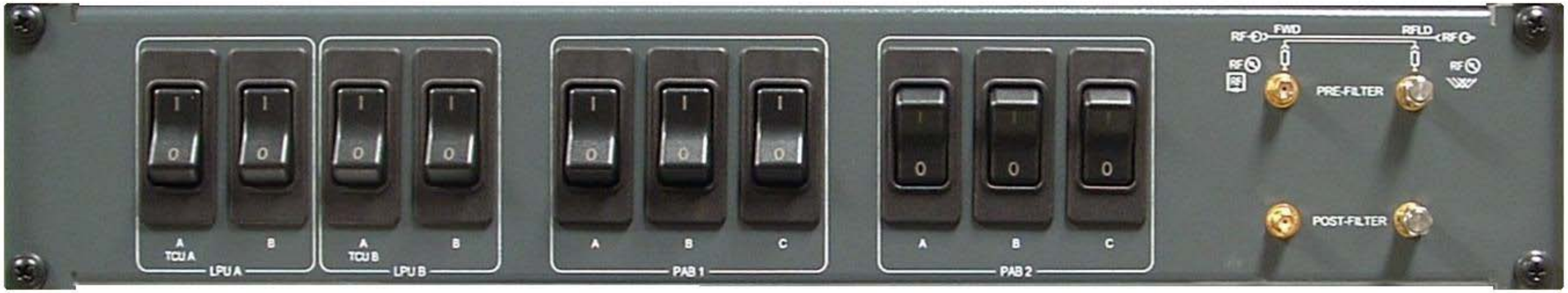


OK

- Single-phase 208-240V (L1 +N, L1+N, L1+N)
- Single-phase 208-240V (L1+L2, L1+L2, L1+L2)
- Three-phase “Delta“ (or Wye, no neutral) (, 208-240V (L1+L2, L2+L3, L3+L1)
- Three-phase “Wye", 360V-415V (measures 208-240VAC L1+N, L2+N, L3+N)

Note: **Systems that utilize three-phase "wye" AC mains should not use a fuse in the neutral leg. Failure to properly connect the neutral wire can result in damage to the transmitter components and will void the warranty.**

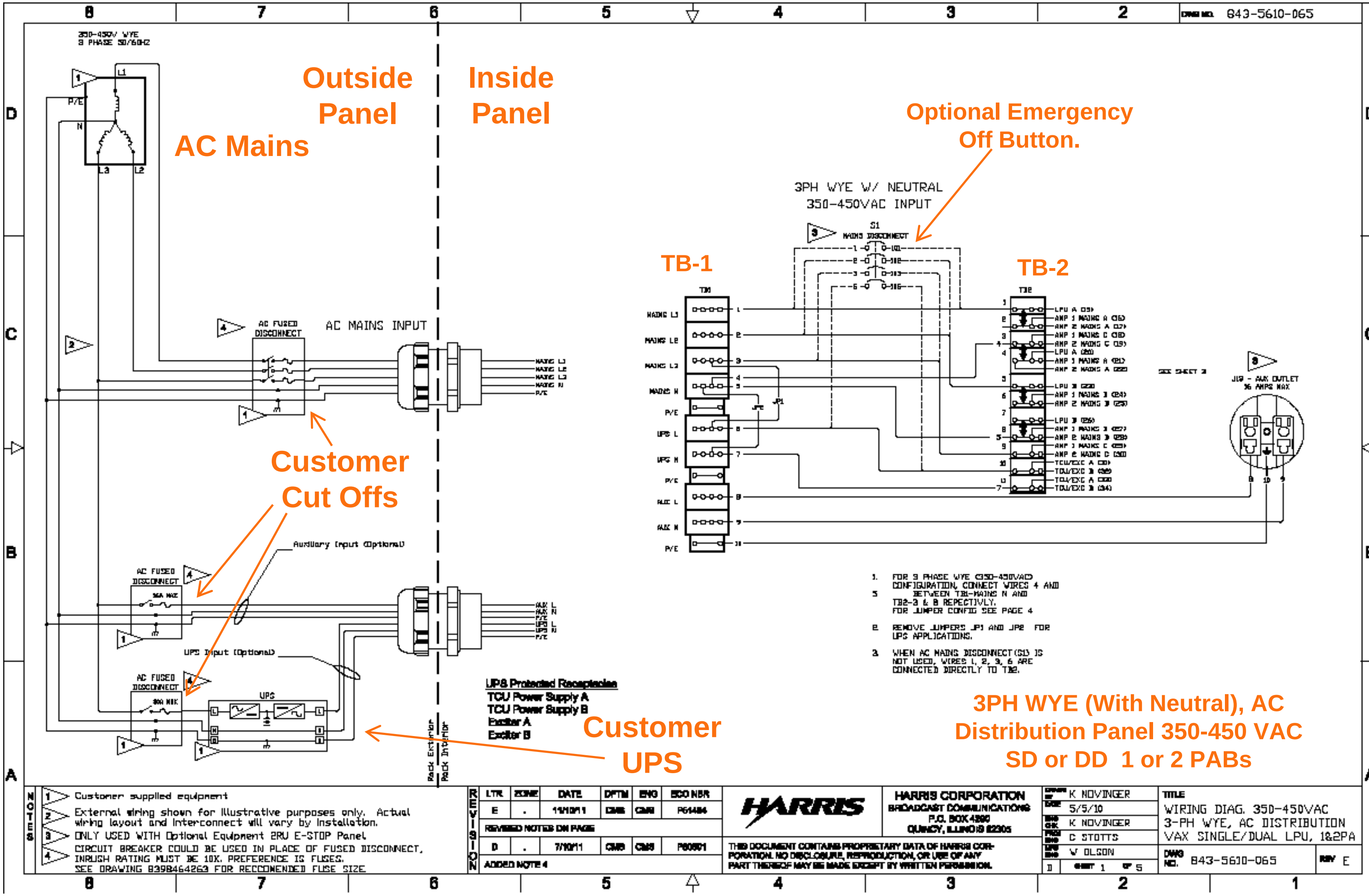
AC DISTRIBUTION PANEL

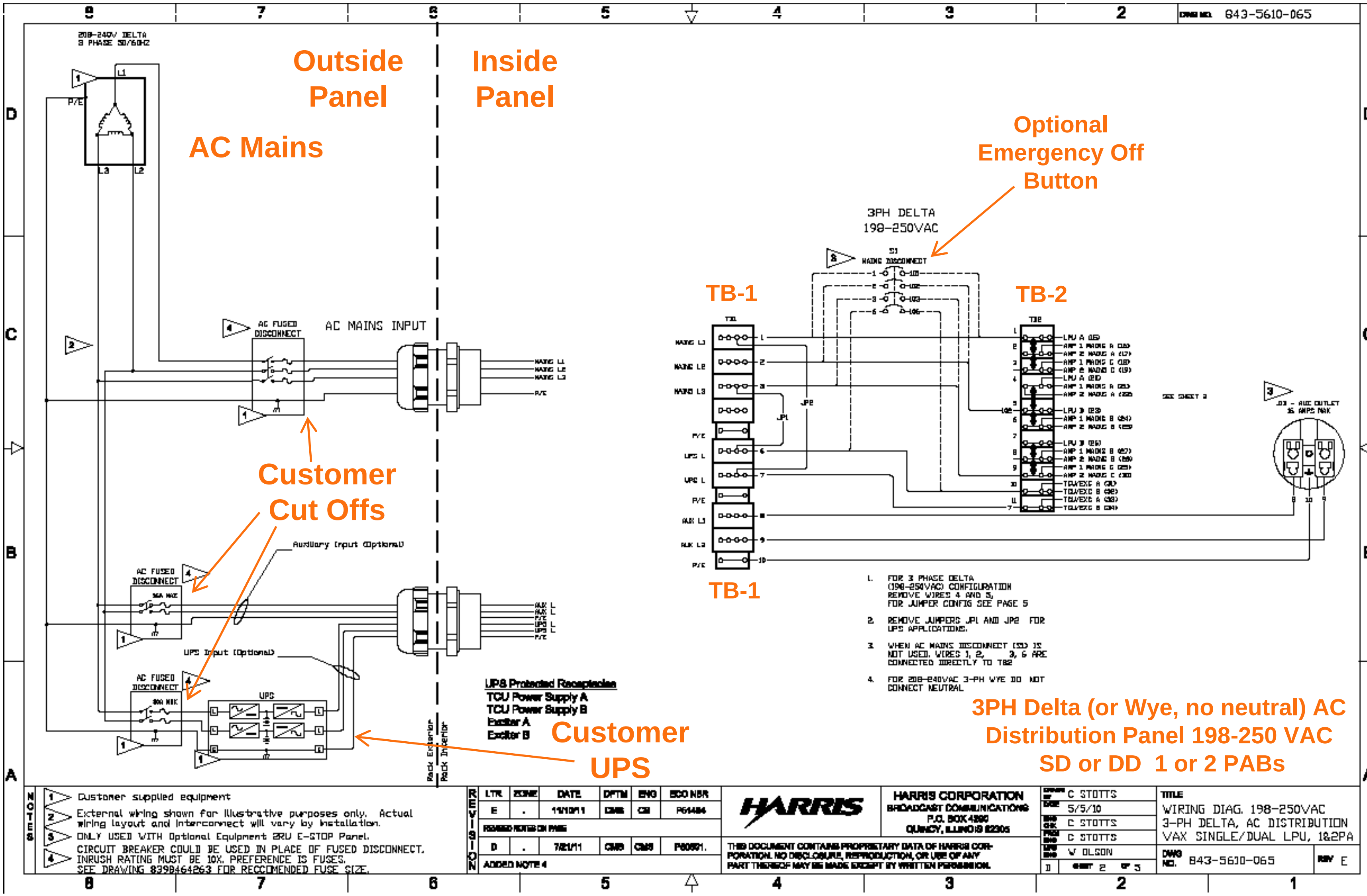


AC Distribution panel



AC Distribution panel with AC mains switch, emergency off button, and outlet

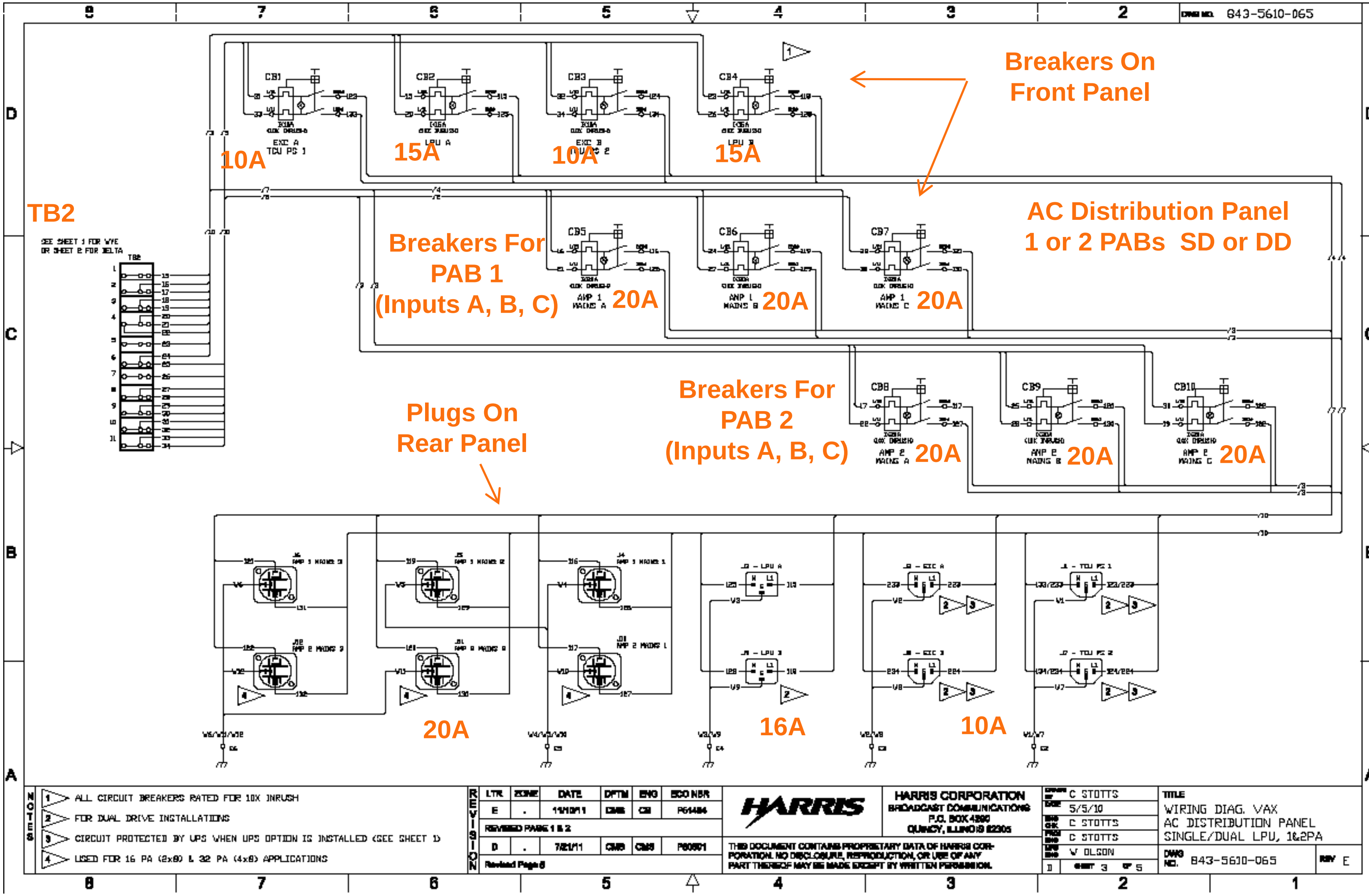

Outside Panel
Inside Panel
AC Mains
Optional Emergency Off Button.
3PH WYE W/ NEUTRAL
350-450VAC INPUT
TB-1
TB-2
AC MAINS INPUT
Customer Cut Offs
Auxiliary Input (Optional)
UPS Input (Optional)
UPS Protected Receptacles
TCU Power Supply A
TCU Power Supply B
Exciter A
Exciter B
Customer UPS
1. FOR 3 PHASE WYE (350-450VAC) CONFIGURATION, CONNECT WIRES 4 AND 5 BETWEEN TB1-MAINS N AND TB2-3 & 8 RESPECTIVLY. FOR JUMPER CONFIG SEE PAGE 4
2. REMOVE JUMPERS JP1 AND JP2 FOR UPS APPLICATIONS.
3. WHEN AC MAINS DISCONNECT (S1) IS NOT USED, WIRES 1, 2, 3, 6 ARE CONNECTED DIRECTLY TO TB2.
3PH WYE (With Neutral), AC Distribution Panel 350-450 VAC SD or DD 1 or 2 PABs
NOTES
1 Customer supplied equipment
2 External wiring shown for illustrative purposes only. Actual wiring layout and interconnect will vary by installation.
3 ONLY USED WITH Optional Equipment 2RU E-STOP Panel
4 CIRCUIT BREAKER COULD BE USED IN PLACE OF FUSED DISCONNECT. INRUSH RATING MUST BE 10X. PREFERENCE IS FUSES. SEE DRAWING 8398464263 FOR RECCOMENDED FUSE SIZE
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BROADCAST COMMUNICATIONS
P.O. BOX 4290
QUINCY, ILLINOIS 62305
WIRING DIAG. 350-450VAC 3-PH WYE, AC DISTRIBUTION VAX SINGLE/DUAL LPU, 1&2PA
DWG NO. 843-5610-065
REV E



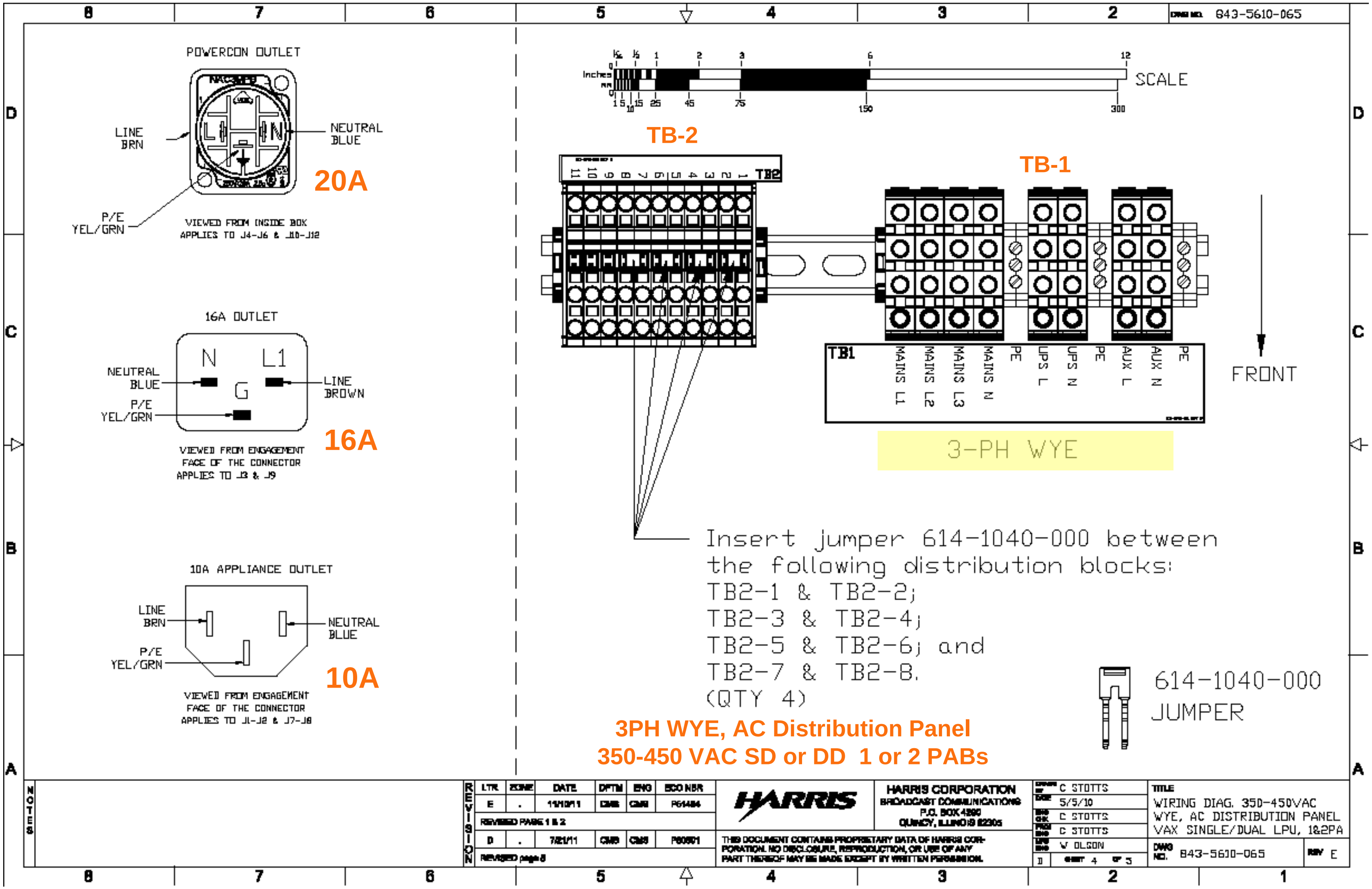
Outside Panel
Inside Panel
AC Mains
208-240V DELTA
3 PHASE 50/60HZ
AC MAINS INPUT
Customer Cut Offs
Auxiliary Input (Optional)
UPS Input (Optional)
UPS
Customer UPS
UPS Protected Receptacles
TCU Power Supply A
TCU Power Supply B
Exciter A
Exciter B
Optional Emergency Off Button
3PH DELTA
198-250VAC
TB-1
TB-2
3PH Delta (or Wye, no neutral) AC Distribution Panel 198-250 VAC SD or DD 1 or 2 PABs
Customer supplied equipment
External wiring shown for illustrative purposes only. Actual wiring layout and interconnect will vary by installation.
ONLY USED WITH Optional Equipment 2RU E-STOP Panel.
CIRCUIT BREAKER COULD BE USED IN PLACE OF FUSED DISCONNECT. INRUSH RATING MUST BE 10X. PREFERENCE IS FUSES. SEE DRAWING 8398464263 FOR RECCOMMENDED FUSE SIZE.
HARRIS
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P.O. BOX 4290
QUINCY, ILLINOIS 62305
WIRING DIAG. 198-250VAC
3-PH DELTA, AC DISTRIBUTION
VAX SINGLE/DUAL LPU, 1&2PA
843-5610-065

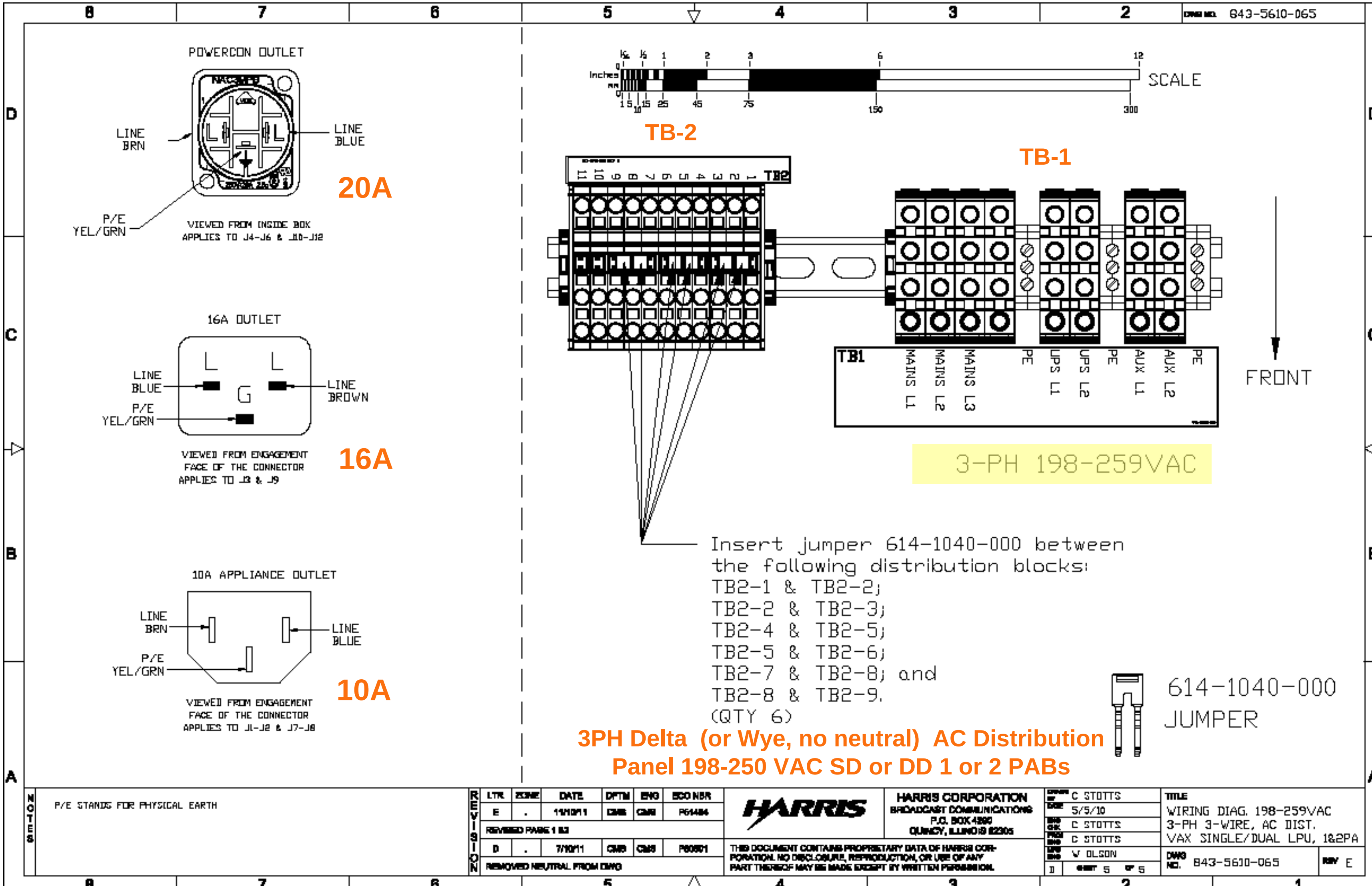
2 of 5

VAX AC DISTRIBUTION, PANEL 843-5610-065 SECTION 100



3 of 5


POWERCON OUTLET
LINE BRN
NEUTRAL BLUE
P/E YEL/GRN
20A
VIEWED FROM INSIDE BOX
APPLIES TO J4-J6 & J10-J12
16A OUTLET
N
L1
G
NEUTRAL BLUE
LINE BROWN
P/E YEL/GRN
16A
VIEWED FROM ENGAGEMENT FACE OF THE CONNECTOR
APPLIES TO J3 & J9
10A APPLIANCE OUTLET
LINE BRN
NEUTRAL BLUE
P/E YEL/GRN
10A
VIEWED FROM ENGAGEMENT FACE OF THE CONNECTOR
APPLIES TO J1-J2 & J7-J8
SCALE
TB-2
TB-1
TB2
TB1
MAINS L1
MAINS L2
MAINS L3
MAINS N
PE
UPS L
UPS N
PE
AUX L
AUX N
PE
FRONT
3-PH WYE
Insert jumper 614-1040-000 between the following distribution blocks:
TB2-1 & TB2-2;
TB2-3 & TB2-4;
TB2-5 & TB2-6; and
TB2-7 & TB2-8.
(QTY 4)
614-1040-000
JUMPER
3PH WYE, AC Distribution Panel
350-450 VAC SD or DD 1 or 2 PABs
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LTR ZONE DATE DFTM ENG ECO NBR
E . 11/10/11 CMS CMS P61484
REVISED PAGE 1 & 2
D . 7/21/11 CMS CMS P60601
REVISED page 5
C STOTTS
5/5/10
C STOTTS
C STOTTS
W OLSON
TITLE
WIRING DIAG. 350-450VAC WYE, AC DISTRIBUTION PANEL VAX SINGLE/DUAL LPU, 1&2PA
DWG NO. 843-5610-065
REV E
SHEET 4 OF 5



POWERCON OUTLET
LINE BRN
LINE BLUE
P/E YEL/GRN
20A
VIEWED FROM INSIDE BOX
APPLIES TO J4-J6 & J10-J12
16A OUTLET
LINE BLUE
LINE BROWN
P/E YEL/GRN
16A
VIEWED FROM ENGAGEMENT FACE OF THE CONNECTOR
APPLIES TO J3 & J9
10A APPLIANCE OUTLET
LINE BRN
LINE BLUE
P/E YEL/GRN
10A
VIEWED FROM ENGAGEMENT FACE OF THE CONNECTOR
APPLIES TO J1-J2 & J7-J8
SCALE
TB-2
TB-1
TB1
MAINS L1
MAINS L2
MAINS L3
PE
UPS L1
UPS L2
PE
AUX L1
AUX L2
PE
FRONT
3-PH 198-259VAC
Insert jumper 614-1040-000 between the following distribution blocks:
TB2-1 & TB2-2;
TB2-2 & TB2-3;
TB2-4 & TB2-5;
TB2-5 & TB2-6;
TB2-7 & TB2-8; and
TB2-8 & TB2-9.
(QTY 6)
614-1040-000 JUMPER
3PH Delta (or Wye, no neutral) AC Distribution Panel 198-250 VAC SD or DD 1 or 2 PABs
P/E STANDS FOR PHYSICAL EARTH
E 11/10/11 P61484 REVISED PAGE 1 & 3
D 7/10/11 P60601 REMOVED NEUTRAL FROM DWG
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P.O. BOX 4290
QUINCY, ILLINOIS 62305
C STOTTS
5/5/10
C STOTTS
C STOTTS
W OLSON
WIRING DIAG. 198-259VAC 3-PH 3-WIRE, AC DIST. VAX SINGLE/DUAL LPU, 1&2PA
843-5610-065

5 of 5

VAX LPU

VAX 5 RU Low Power Unit (LPU)

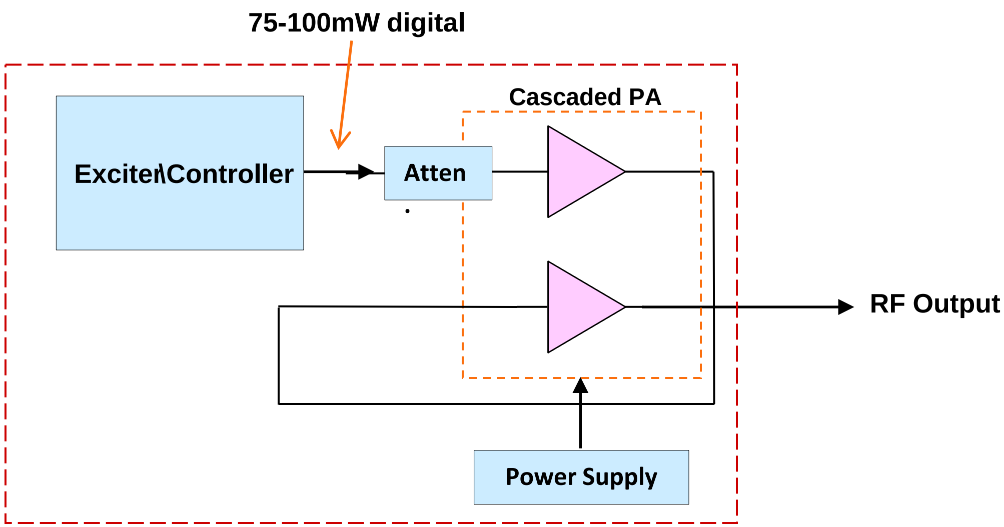
- Control & Monitoring
- Front Panel GUI
- Remote Web GUI
- M2X exciter technology
  - RTAC
  - GPS option
  - Exciter UPS
- Power levels:
  - 100W COFDM TV
  - 150W DAB
  - 180W ATSC
  - 250W Analog





1RU = 1.75in = 4.45cm

BLOCK DIAGRAM VAX LPU



Power levels (pre-filter)

TV COFDM:	50 / 100 W
DAB:	50 / 150 W
ATSC:	60 / 180 W
Analog:	100 / 250 W



5 RU

Lower power versions available. Hardware same. Software limits power.

LPU used in single pallet configuration for 2 PAB cascade case.

100-250W Transmitter - LPU

12 V FAN

12V FAN



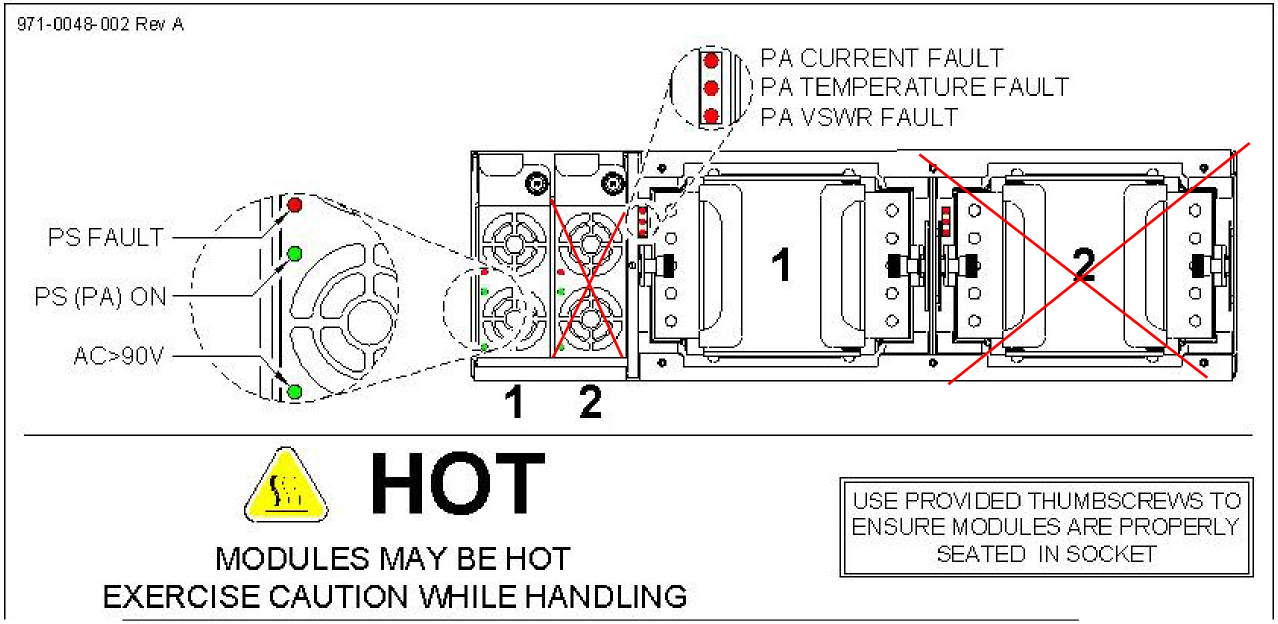
PS Module

Amplifier Module

UDC Sample

Front View (front panel removed)

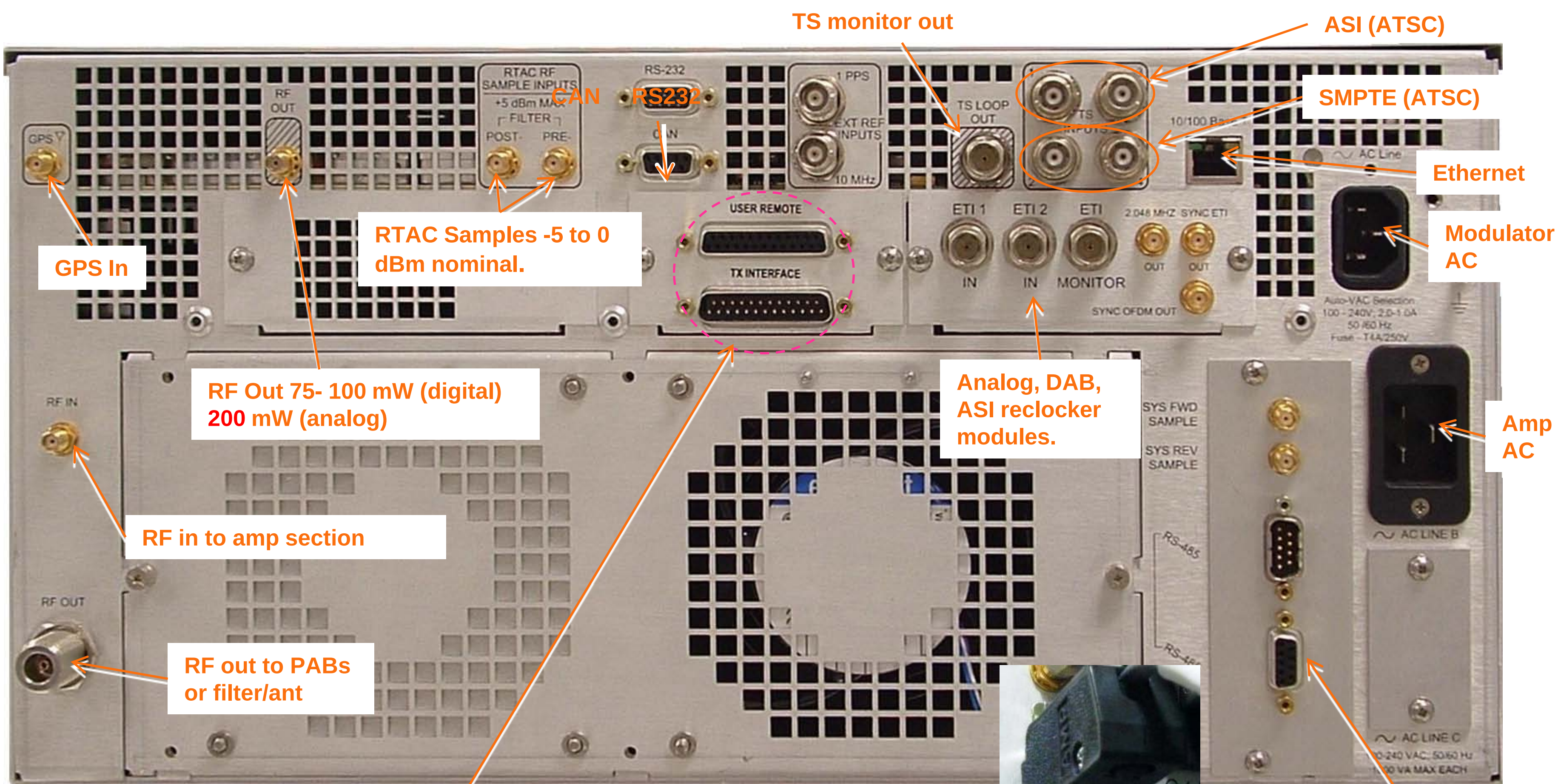
LPU PS & PA LEDs



PS and PA 2 not used in current LPU configurations

LED	Location	Indication	Conditions
PS Fault	Front of PSs	Red/Off	Normally not lit. Red when internal PS overcurrent or overtemperature condition exists.
PS (PA) ON		Green/Off	PS is on and producing 50 VDC.
AC>90V		Green/Off	Green = AC to PS is above 90VAC.
PA Current	PAB backplane behind upper right corner of PA. **Upper left corner of LPU**	Red/Off	PA current has exceeded 20A.
PA Temperature		Red/Off	PA temperature has exceeded 125° C. limit.
PA VSWR		Red/Off	PA reflected power has exceeded approximately 20W

VAX LPU Rear





Used for remote control in standalone system.

Goes to TCU in dual system. Remove cable and LPU takes over.

Safety Intlk pins 6 & 7. RF Mute Intlk pins 4 & 5. On command to reset Safety Intlk. Install jumper plug on last PAB connector in daisy chain.

CONTROLLER/MODULATOR SIDE OF LPU 10W-100W TX

- Micro Module serves as controller for VAX system
- In stand alone systems the controller will gather information for customer display
- Supports many modulation standards – software controls modulation type

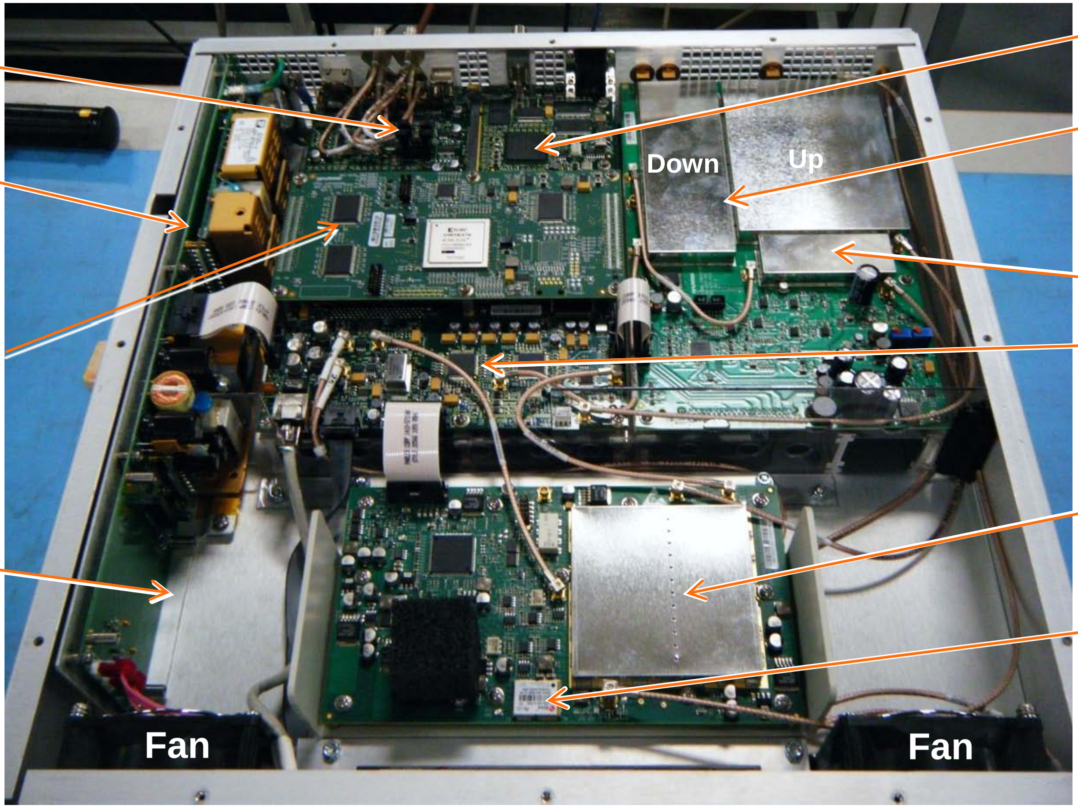
Date/Time Battery

Power Supply

Signal Processor Board

DVB-T2 option (goes above FPGA)

Battery Backup (not installed)



Micro Module

UDC
Remove covers to replace board.
Don't touch pots.

LO Filter

Signal Processor

RF up and down converter, PLL & DAC converter

GPS Rx (activated by feature key (optional).

LPU Front (top cover removed)

OPTIONAL BATTERY BACKUP

The battery backup keeps the GPS receiver, 10 MHz OCXO and associated PFRU circuitry alive for approximately 15 minutes* during a power failure.

This is to ensure that when power is restored, the operator does not have to wait for a GPS re-acquisition or the oscillator to warm back up and re-stabilize. Saves time on restart.

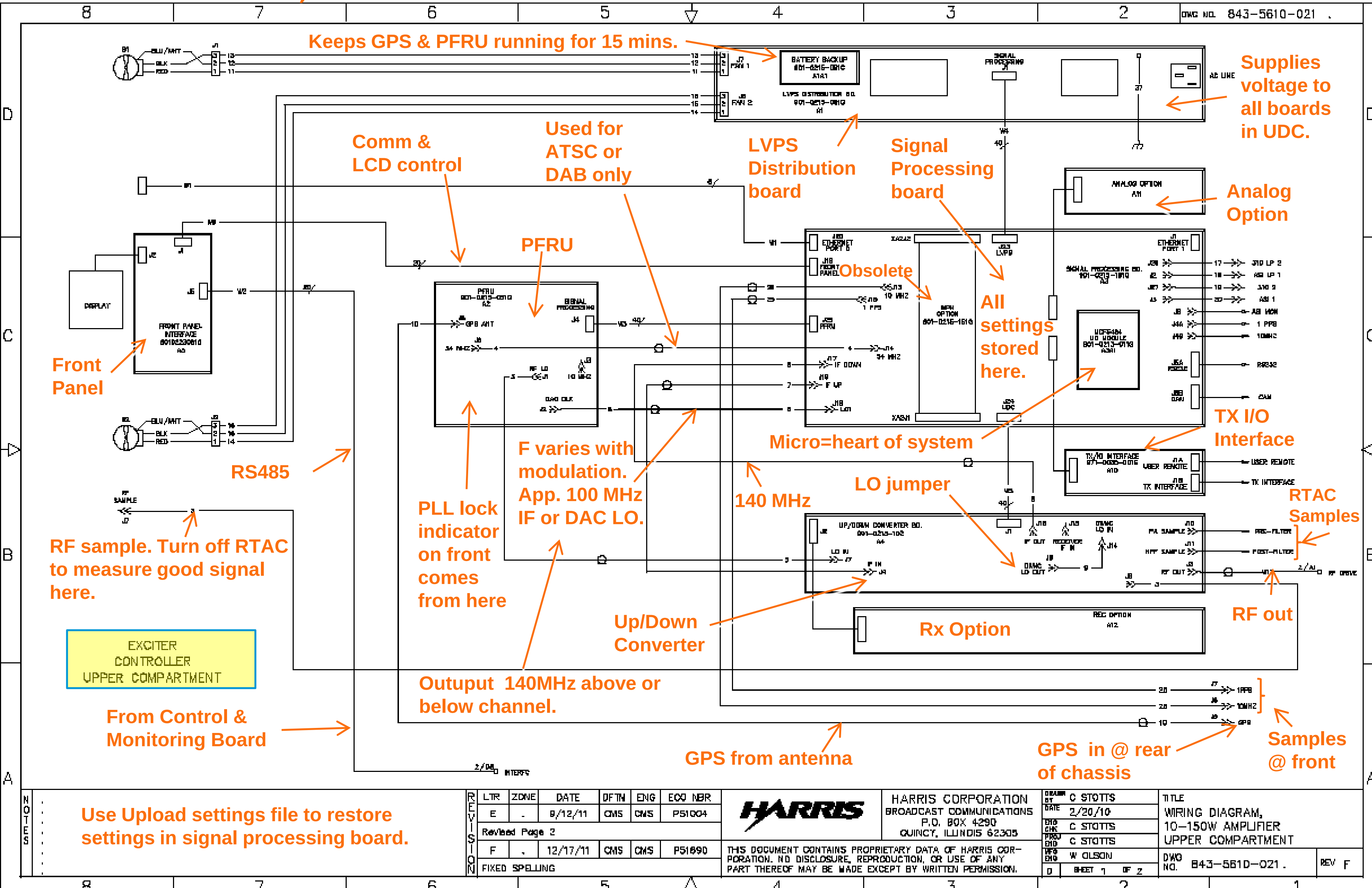
Currently under development is a replacement that will keep the exciter section operating for 1 minute and the PFRU and GPS alive and disciplined for 25-30 minutes.

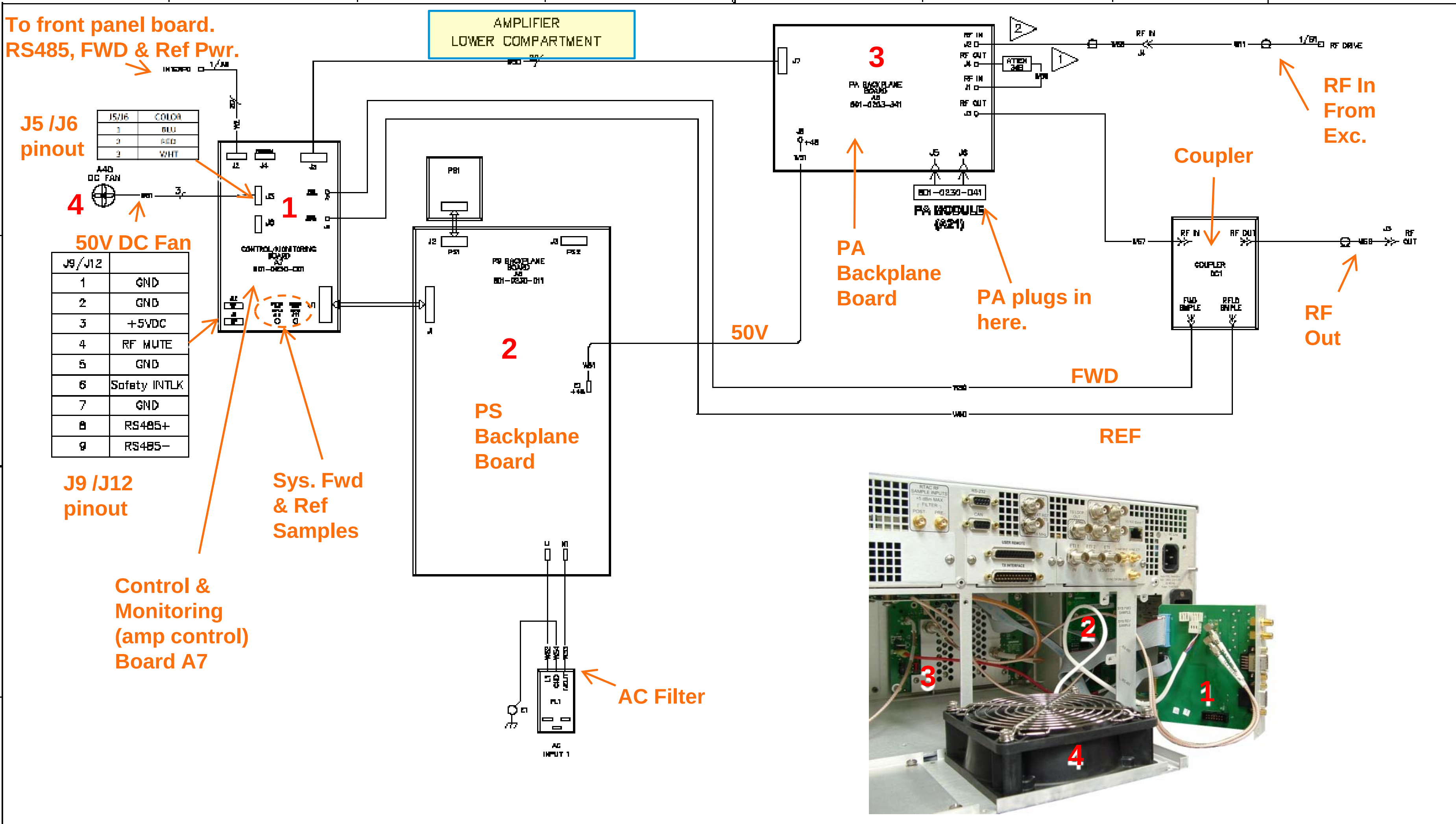
Operation of this circuitry and battery backup option are recommended for SFN installations.

***When batteries are new and fresh. These batteries should be considered a routine maintenance item and replaced at appropriate intervals.**

Replacement every 2-3 years is recommended (500 recharge cycles).

WIRING DIAGRAM , VAX 10-150W AMPLIFIER 843-5610-021 SECTION 200





NOTES	
1	OPTIONAL, SELECT AT TEST WHEN REQUIRED AND USED WITH PA BLOCKS NOT REQUIRED FOR STAND ALONE LPU SYSTEMS
2	FOR VAX-2PA (2-WAY) SYSTEMS, CONNECT W57 TO J4

LTR	ZONE	DATE	DFTN	ENG	ECO NBR
E	.	9/12/11	CMS	CMS	P51004
REVISED CHART					
F	.	12/21/11	CMS	CMS	P51960
Revised DWG					

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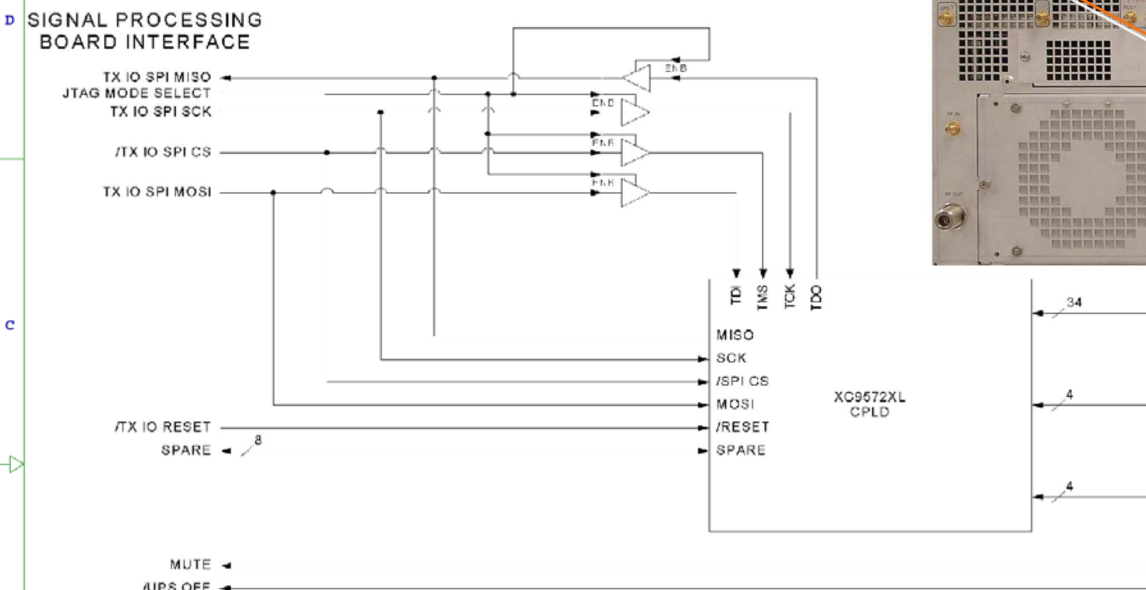
DRAWN BY: C STOTTS
DATE: 2/20/10
ENG CHK: C STOTTS
PROJ ENG: C STOTTS
MFG ENG: W OLSON

TITLE: WIRING DIAGRAM, 10-150W AMPLIFIER LOWER COMPARTMENT

DWG NO. 843-5610-021. REV F

SHEET 2 OF 2

TRANSMITTER I/O BOA



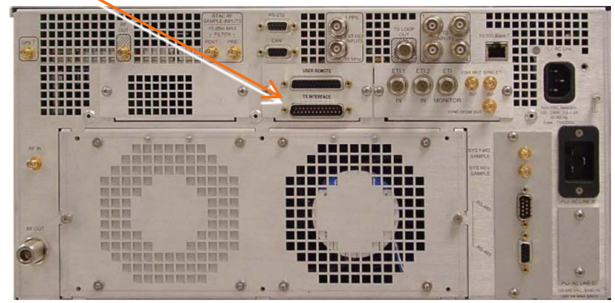


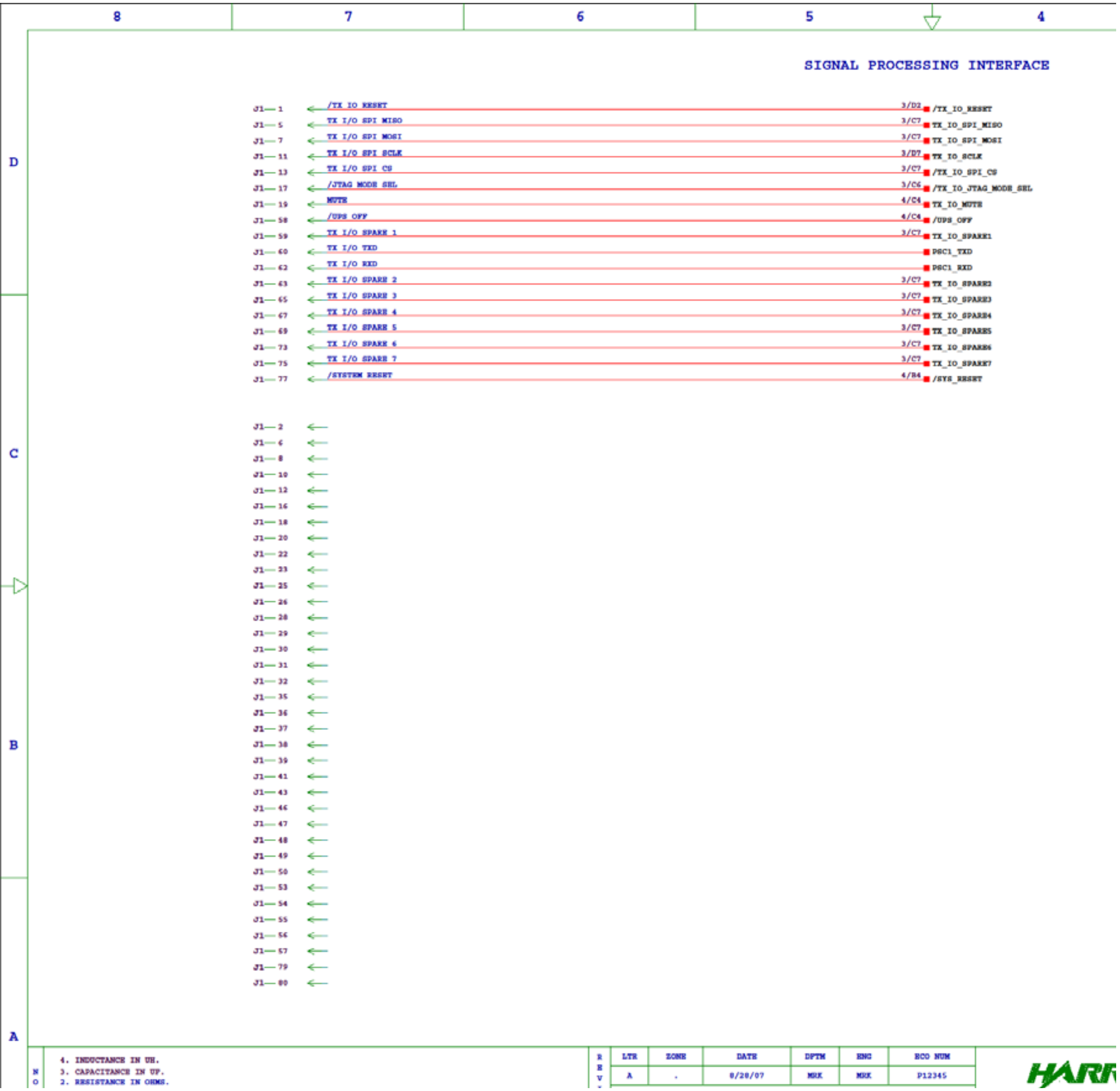
Table 1: I/O Interface Specification

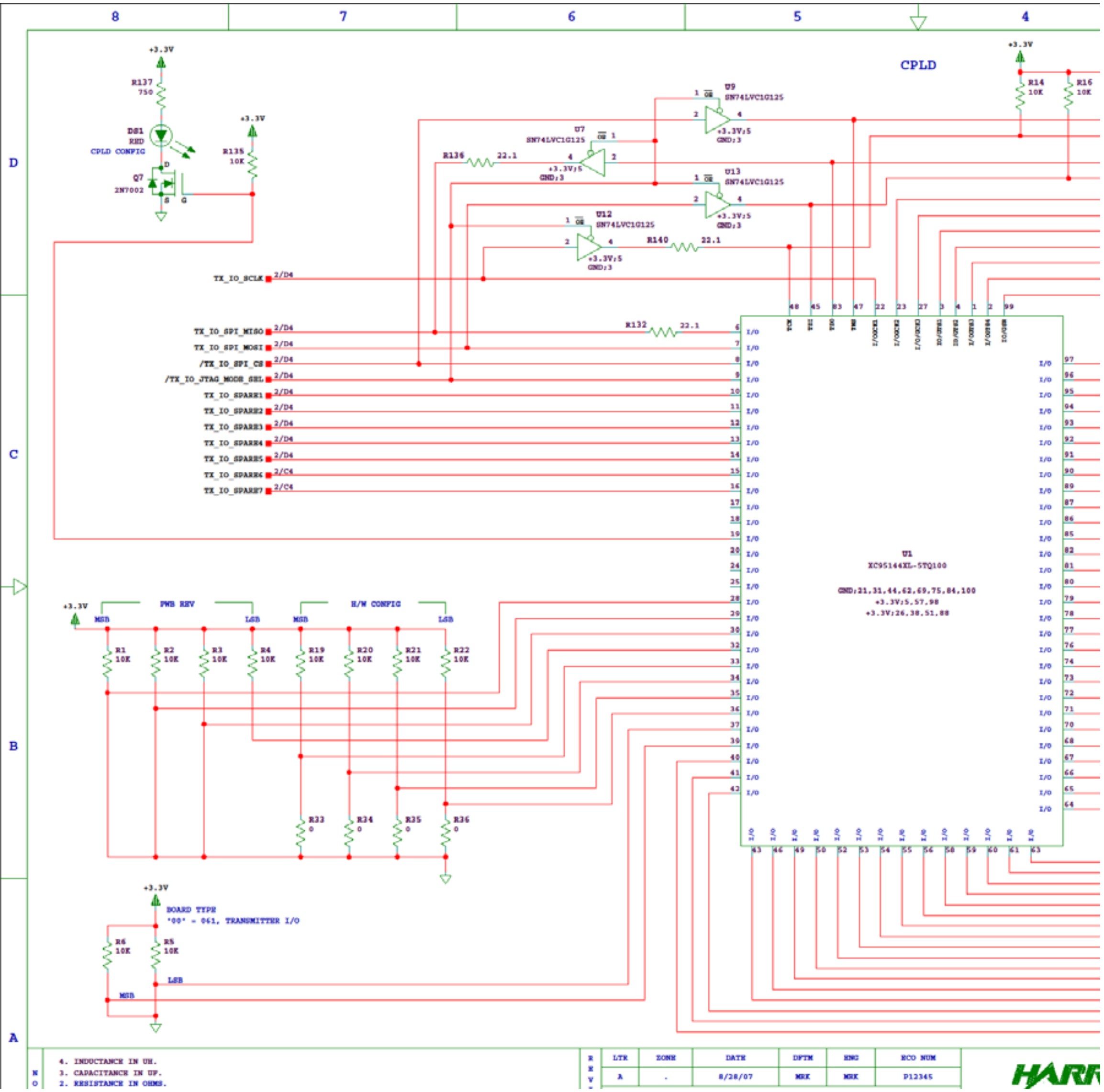
	Specification	Condition
Digital I/O	Digital Input Digital Output Vih = 3.5Vdc min Voh = 2.4Vdc min Vil = 1.35Vdc max Vol= 1.1Vdc max	Digital input – 10mA sink Digital output – 2mA source Digital output – 20mA sink
Analog Out	0-5Vdc	2Kohm load min
Analog In	0-5Vdc	Input impedance - 2Kohm

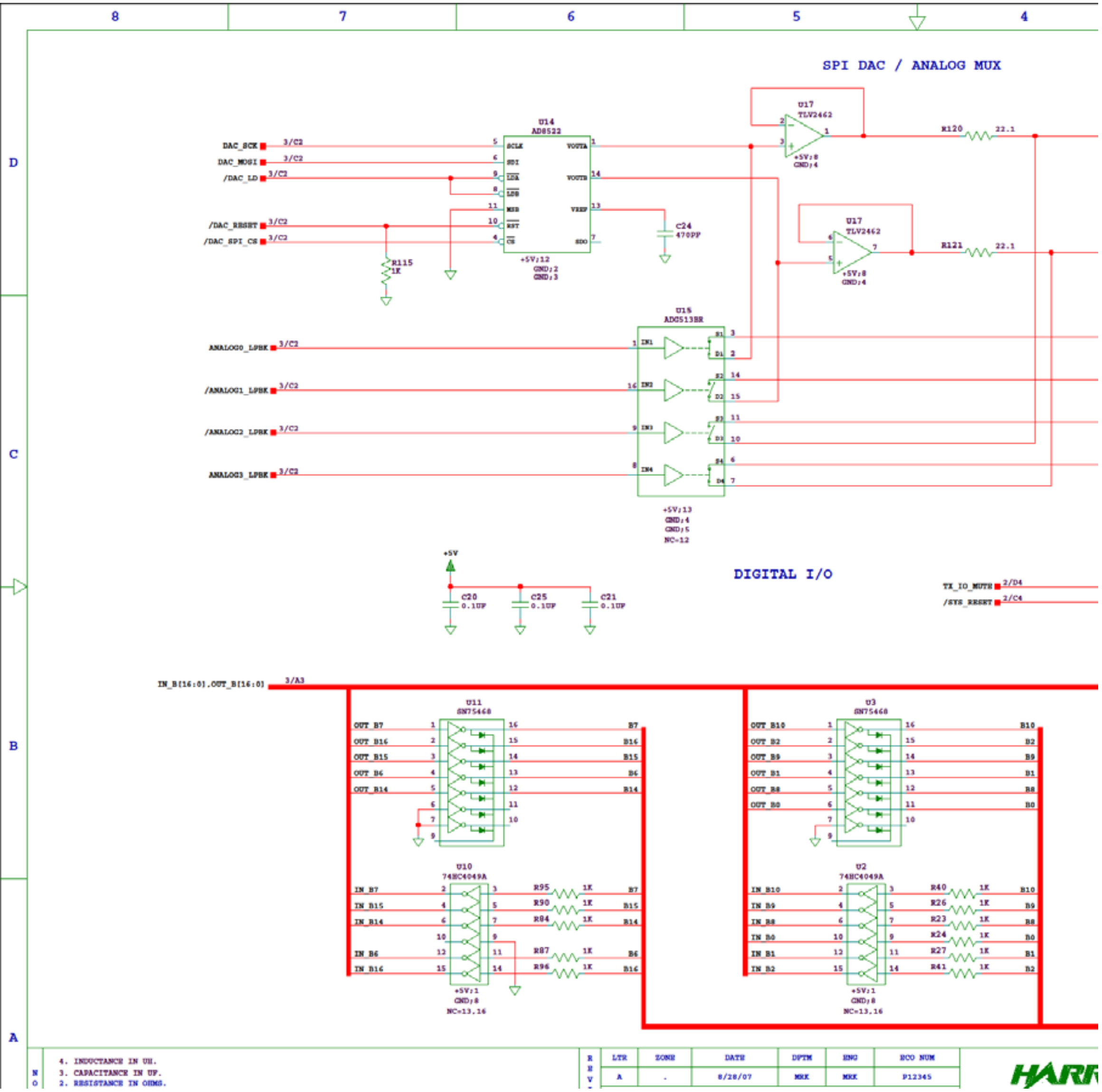
4. INDUCTANCE IN UH.
3. CAPACITANCE IN UF.
2. RESISTANCE IN OHMS.

LTR	ZONE	DATE	DFTM	ENG	ECO NUM
A	-	8/20/07	MRK	MRK	P12345

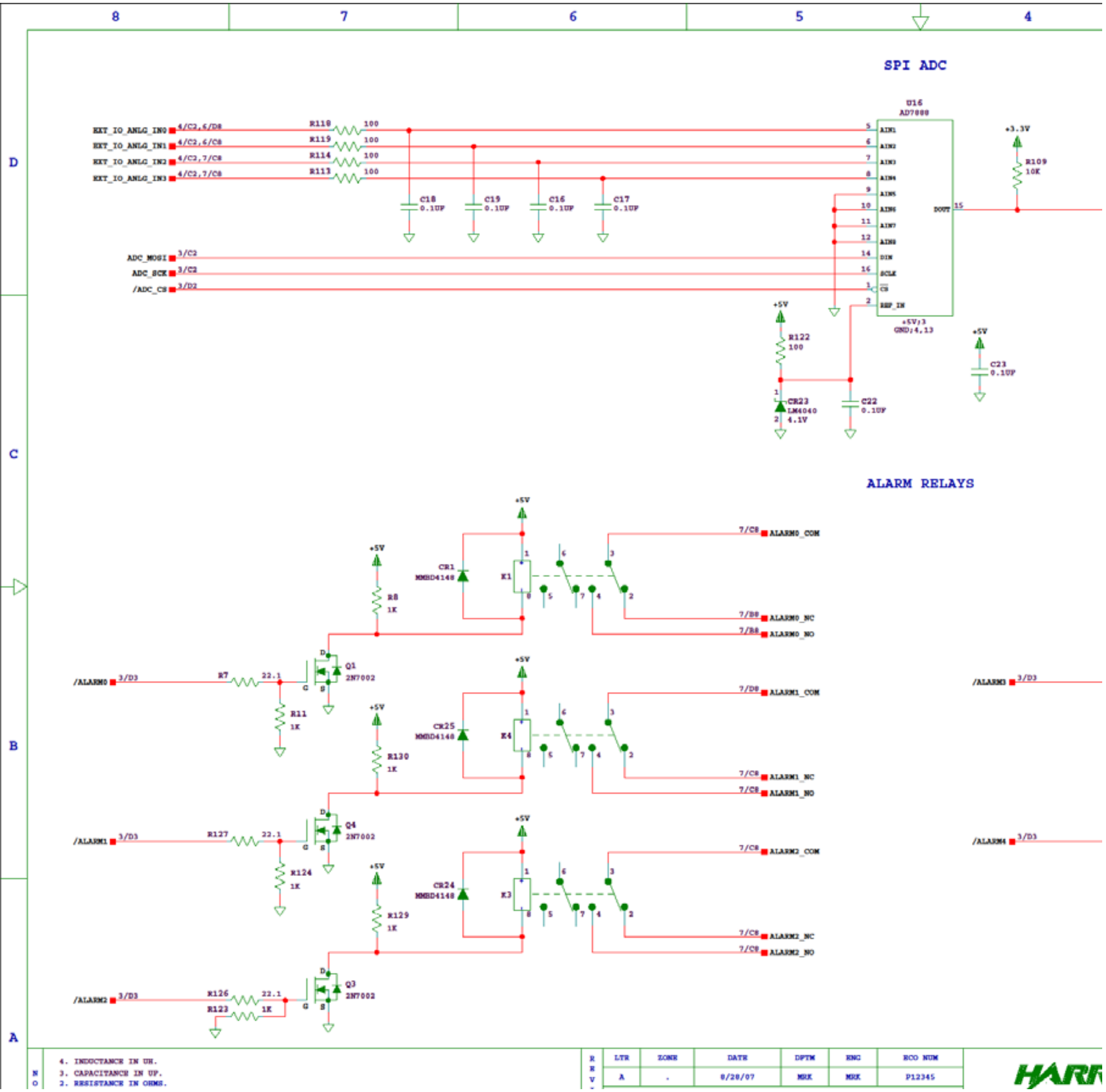
HARR


SIGNAL PROCESSING INTERFACE
J1— 1 /TX IO RESET 3/D2 /TX_IO_RESET
J1— 5 TX I/O SPI MISO 3/C7 TX_IO_SPI_MISO
J1— 7 TX I/O SPI MOSI 3/C7 TX_IO_SPI_MOSI
J1— 11 TX I/O SPI SCLK 3/D7 TX_IO_SCLK
J1— 13 TX I/O SPI CS 3/C7 /TX_IO_SPI_CS
J1— 17 /JTAG MODE SEL 3/C6 /TX_IO_JTAG_MODE_SEL
J1— 19 MUTE 4/C4 TX_IO_MUTE
J1— 58 /UPS OFF 4/C4 /UPS_OFF
J1— 59 TX I/O SPARE 1 3/C7 TX_IO_SPARE1
J1— 60 TX I/O TXD PSC1_TXD
J1— 62 TX I/O RXD PSC1_RXD
J1— 63 TX I/O SPARE 2 3/C7 TX_IO_SPARE2
J1— 65 TX I/O SPARE 3 3/C7 TX_IO_SPARE3
J1— 67 TX I/O SPARE 4 3/C7 TX_IO_SPARE4
J1— 69 TX I/O SPARE 5 3/C7 TX_IO_SPARE5
J1— 73 TX I/O SPARE 6 3/C7 TX_IO_SPARE6
J1— 75 TX I/O SPARE 7 3/C7 TX_IO_SPARE7
J1— 77 /SYSTEM RESET 4/B4 /SYS_RESET
J1— 2
J1— 6
J1— 8
J1— 10
J1— 12
J1— 16
J1— 18
J1— 20
J1— 22
J1— 23
J1— 25
J1— 26
J1— 28
J1— 29
J1— 30
J1— 31
J1— 32
J1— 35
J1— 36
J1— 37
J1— 38
J1— 39
J1— 41
J1— 43
J1— 46
J1— 47
J1— 48
J1— 49
J1— 50
J1— 53
J1— 54
J1— 55
J1— 56
J1— 57
J1— 79
J1— 80
4. INDUCTANCE IN UH.
3. CAPACITANCE IN UF.
2. RESISTANCE IN OHMS.
LTR ZONE DATE DFTM ENG ECO NUM
A - 8/28/07 MRK MRK P12345

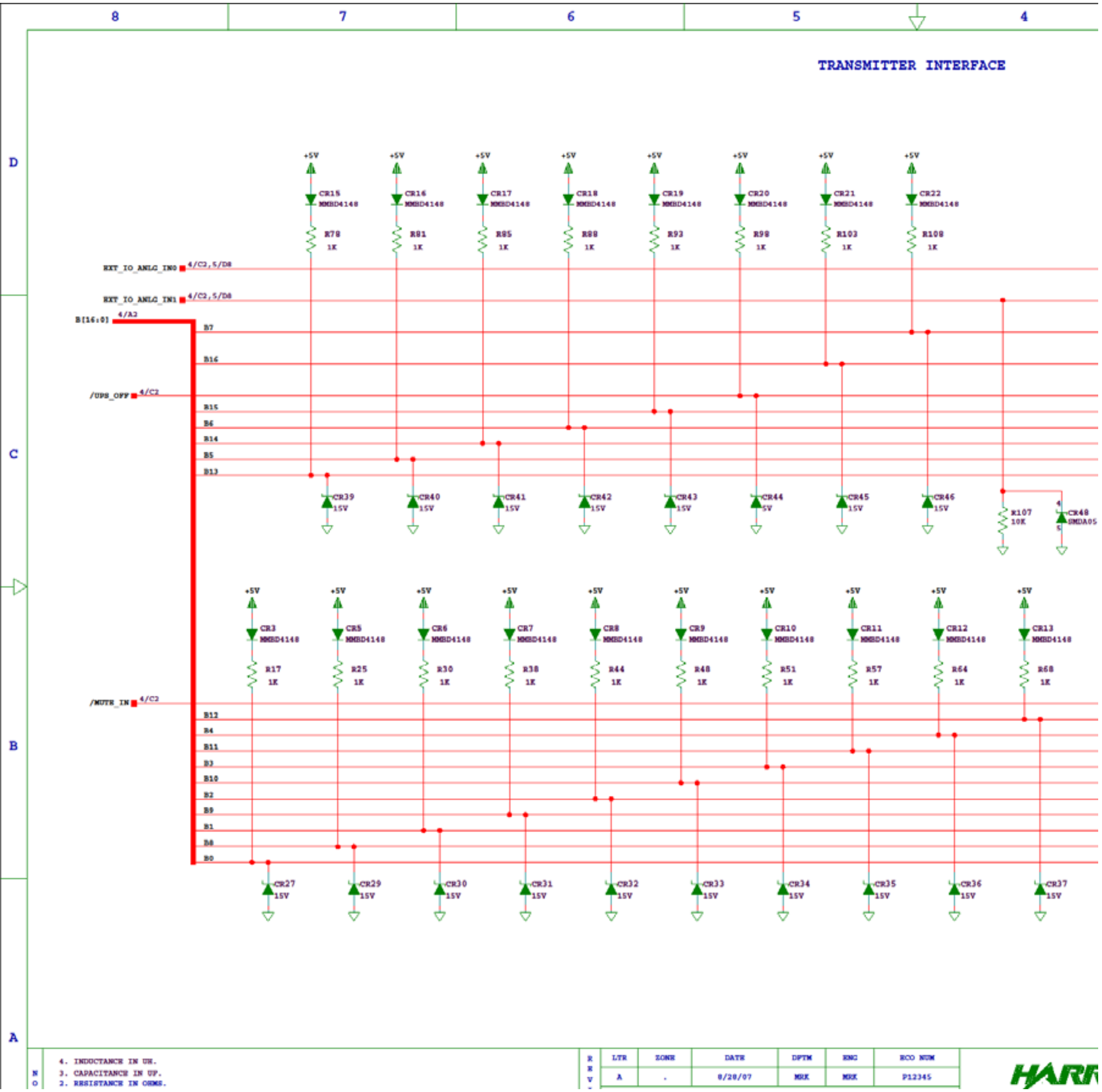




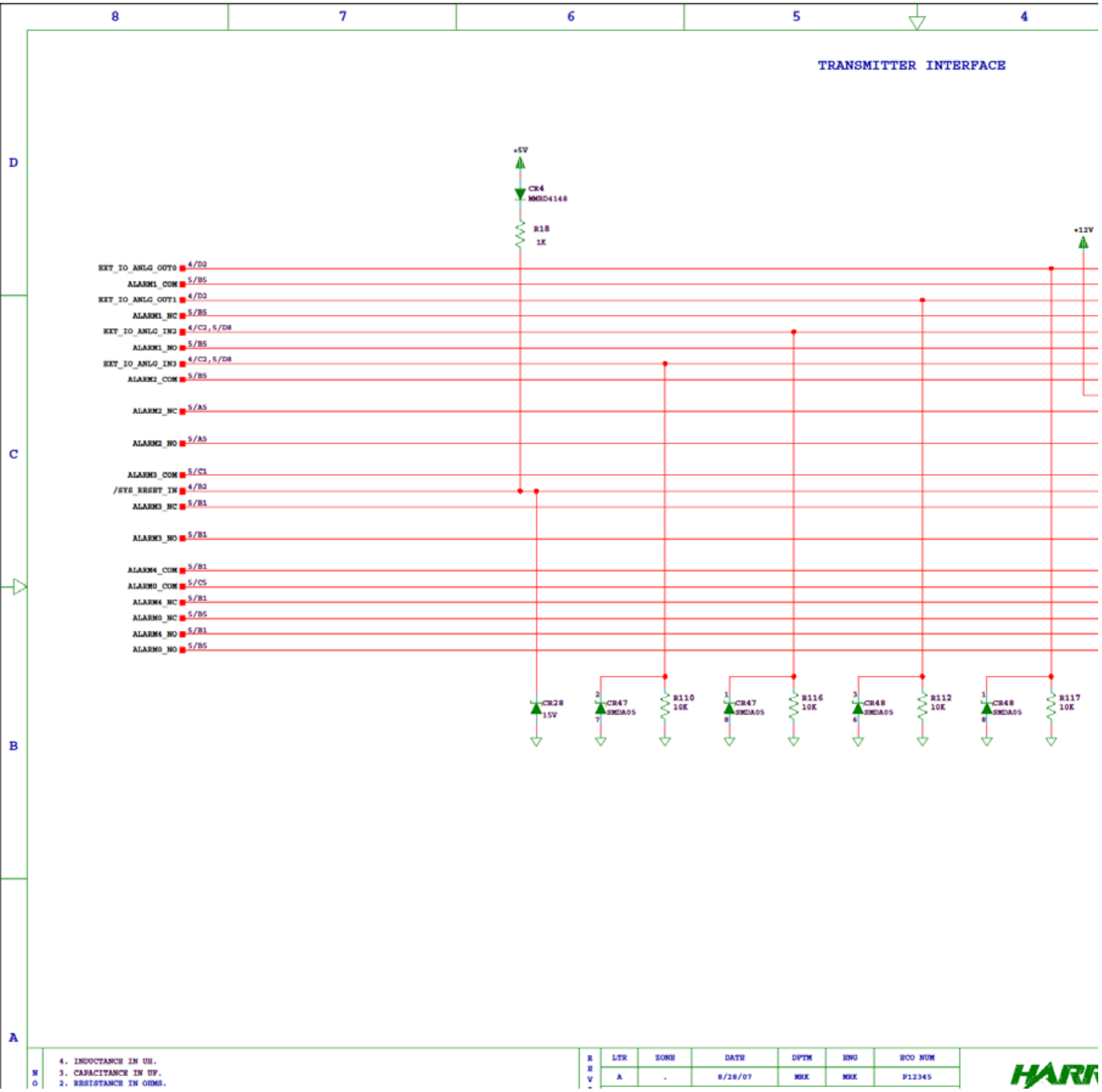
SPI DAC / ANALOG MUX
DIGITAL I/O
U14 AD8522
U17 TLV2462
U15 ADG513BR
U11 SN75468
U3 SN75468
U10 74HC4049A
U2 74HC4049A
DAC_SCK
DAC_MOSI
/DAC_LD
/DAC_RESET
/DAC_SPI_CS
ANALOG0_LPBK
/ANALOG1_LPBK
/ANALOG2_LPBK
ANALOG3_LPBK
TX_IO_MUTE
/SYS_RESET
IN_B[16:0],OUT_B[16:0]
4. INDUCTANCE IN UH.
3. CAPACITANCE IN UF.
2. RESISTANCE IN OHMS.

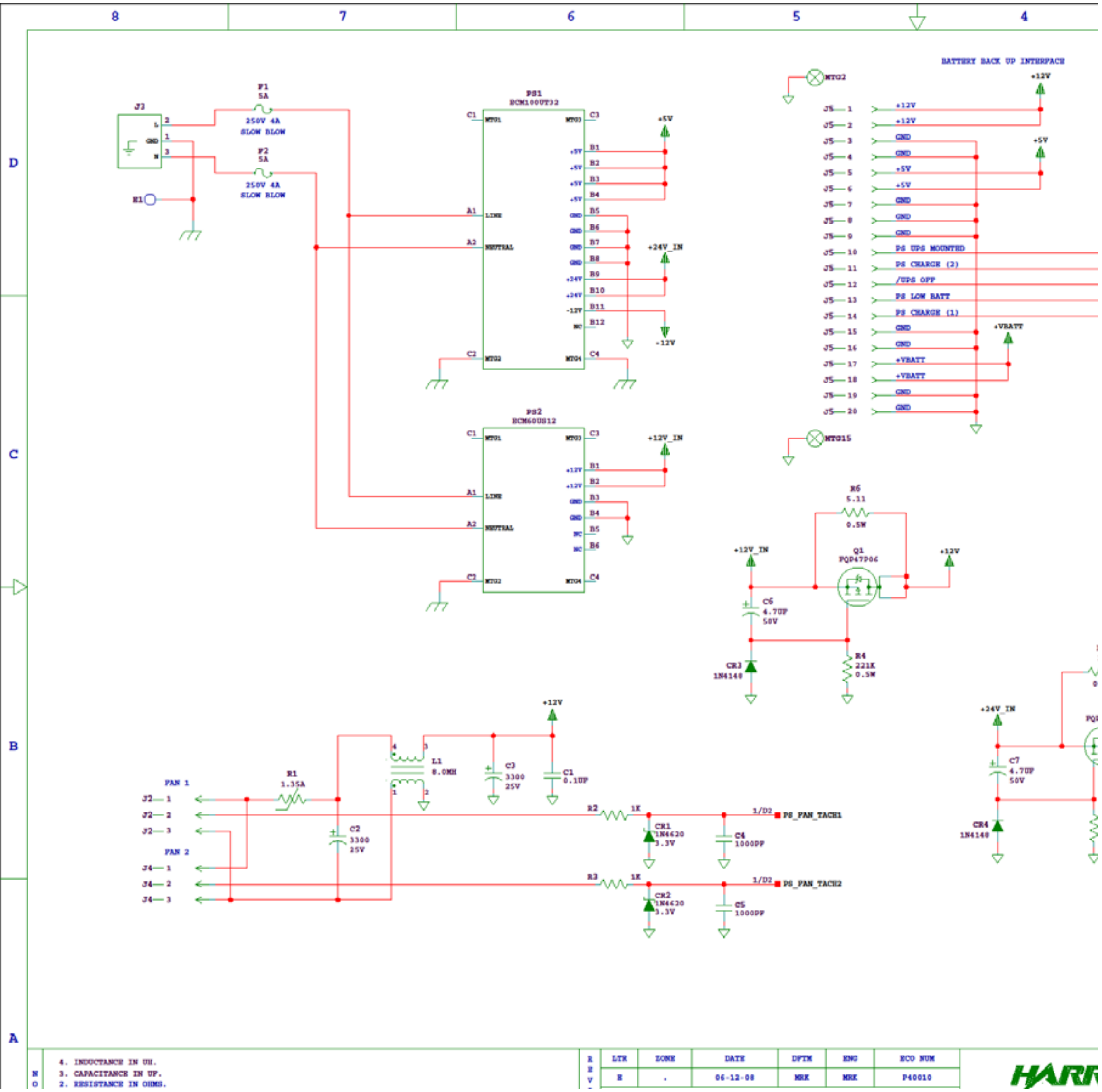


SPI ADC
U16
AD7888
EXT_IO_ANLG_IN0
EXT_IO_ANLG_IN1
EXT_IO_ANLG_IN2
EXT_IO_ANLG_IN3
ADC_MOSI
ADC_SCK
/ADC_CS
+3.3V
R109
10K
R122
100
CR23
LM4040
4.1V
C22
0.1UF
C23
0.1UF
ALARM RELAYS
/ALARM0
/ALARM1
/ALARM2
/ALARM3
/ALARM4
ALARM0_COM
ALARM0_NC
ALARM0_NO
ALARM1_COM
ALARM1_NC
ALARM1_NO
ALARM2_COM
ALARM2_NC
ALARM2_NO
Q1
2N7002
Q4
2N7002
Q3
2N7002
CR1
MMBD4148
CR25
MMBD4148
CR24
MMBD4148
4. INDUCTANCE IN UH.
3. CAPACITANCE IN UF.
2. RESISTANCE IN OHMS.
LTR
ZONE
DATE
DFTM
ENG
ECO NUM
A
8/20/07
MRK
MRK
P12345



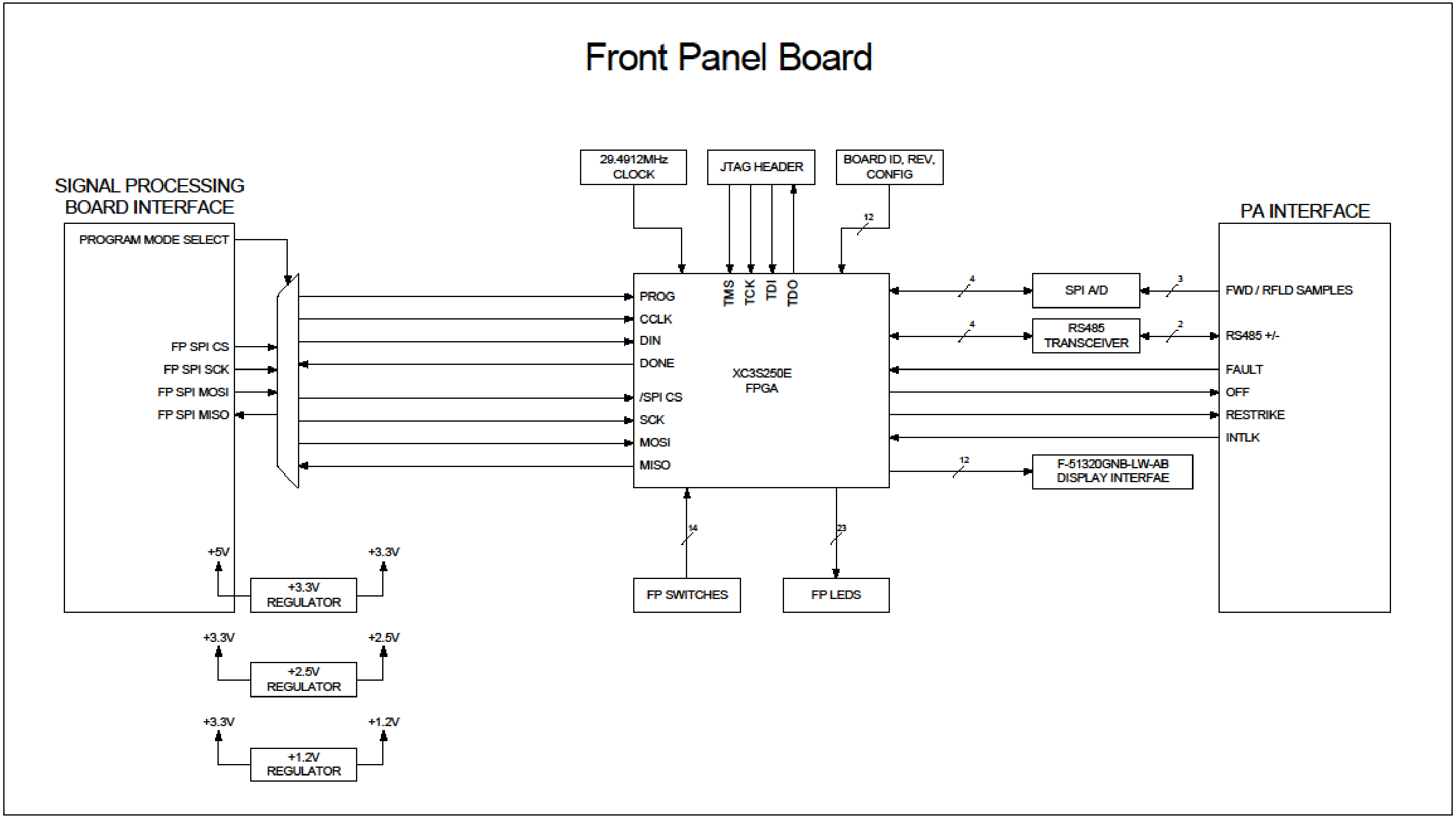
TRANSMITTER INTERFACE
EXT_IO_ANLG_IN0
EXT_IO_ANLG_IN1
B[16:0]
/UPS_OFF
/MUTE_IN
4. INDUCTANCE IN UH.
3. CAPACITANCE IN UF.
2. RESISTANCE IN OHMS.


TRANSMITTER INTERFACE
+5V
CR4
MMBD4148
R18
1K
+12V
EXT_IO_ANLG_OUT0
ALARM1_COM
EXT_IO_ANLG_OUT1
ALARM1_NC
EXT_IO_ANLG_IN2
ALARM1_NO
EXT_IO_ANLG_IN3
ALARM2_COM
ALARM2_NC
ALARM2_NO
ALARM3_COM
/SYS_RESET_IN
ALARM3_NC
ALARM3_NO
ALARM4_COM
ALARM0_COM
ALARM4_NC
ALARM0_NC
ALARM4_NO
ALARM0_NO
CR28
15V
CR47
SMDA05
R110
10K
R116
10K
CR48
R112
10K
R117
10K
4. INDUCTANCE IN UH.
3. CAPACITANCE IN UF.
2. RESISTANCE IN OHMS.
LTR
ZONE
DATE
DFTM
ENG
ECO NUM
A
8/28/07
MRK
P12345



DWG # 801-0223-091

Front Panel Board



NOTES
UNLESS OTHERWISE NOTED:
1. ALL RESISTORS ARE 1/10 WATT, 1%.
2. RESISTANCE IN OHMS.
3. CAPACITANCE IN UF.
4. INDUCTANCE IN UH.
5. (2/A3) — SHEET NUMBER, ZONE, CONTINUATION SYMBOL

REVISION

LTR	ZONE	DATE	DFTN	ENG	ECO NUM
C	.	06-16-09	WAK	WAK	P44022
UPDATE SHEET 2, 8					
D	.	07-15-10	WAB	WAK	P47778
UPDATE SHEET 2					

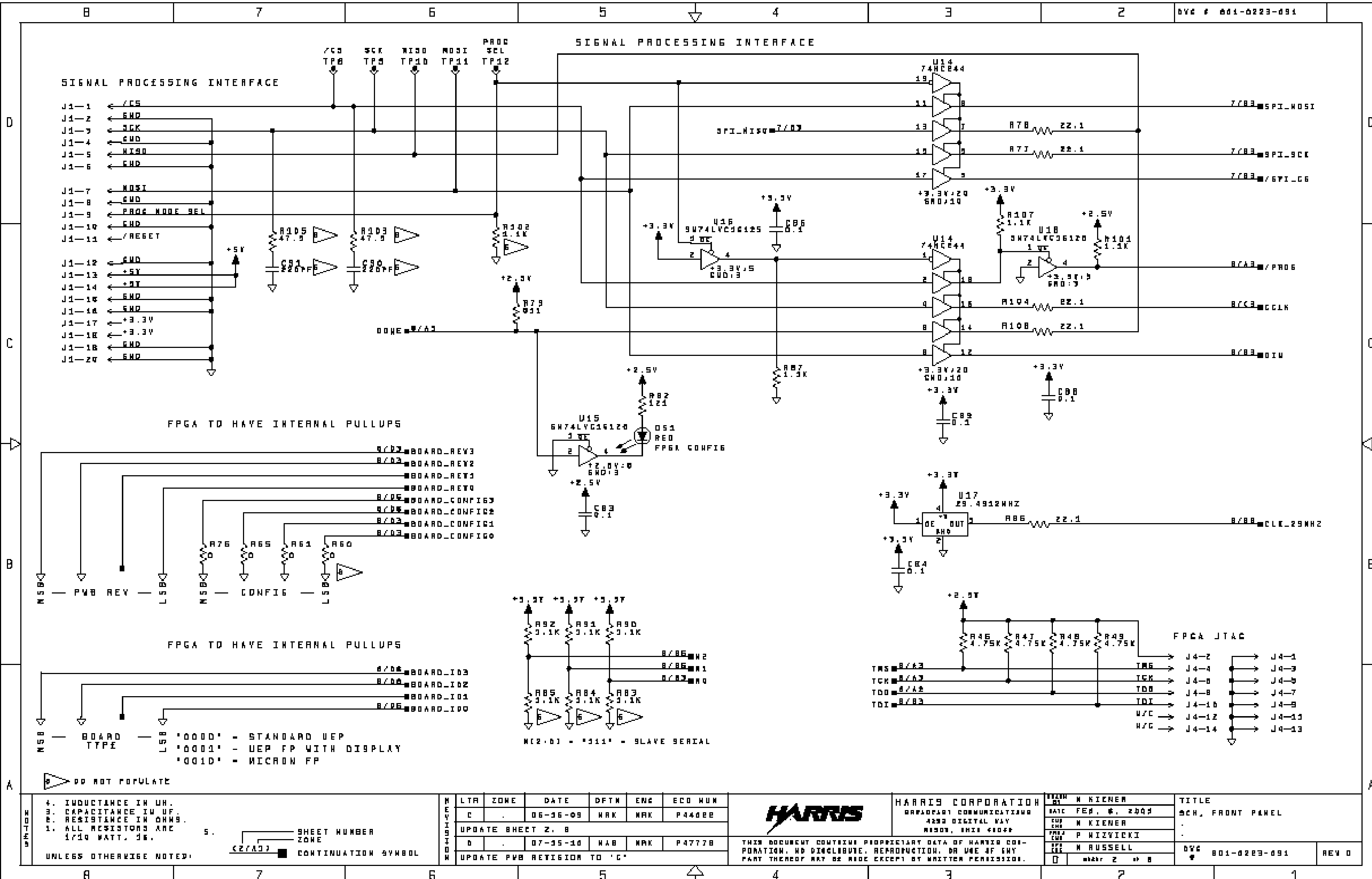
HARRIS

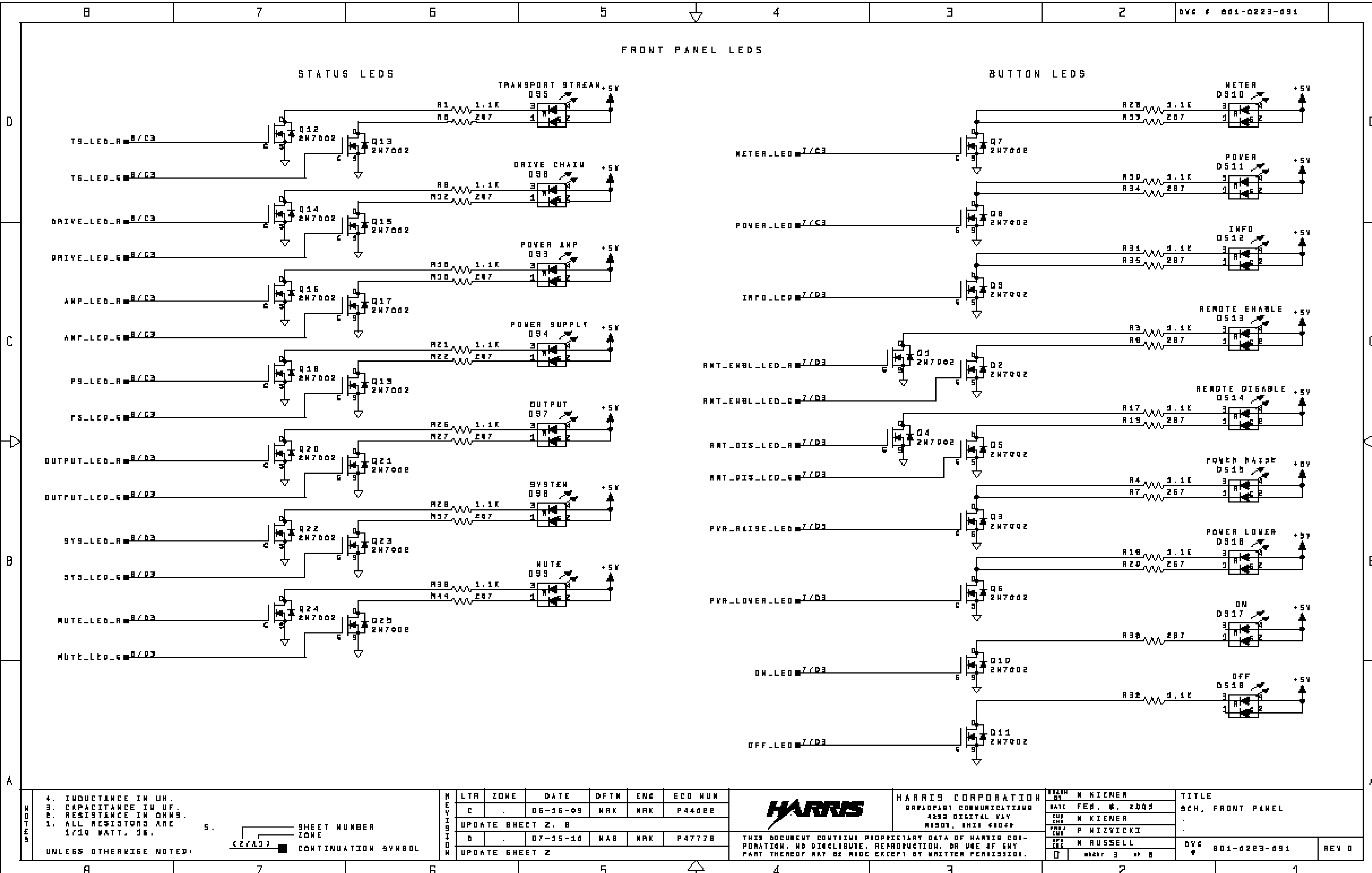
HARRIS CORPORATION
BROADCAST COMMUNICATIONS
4393 DIGITAL WAY
MASON, OHIO 45040

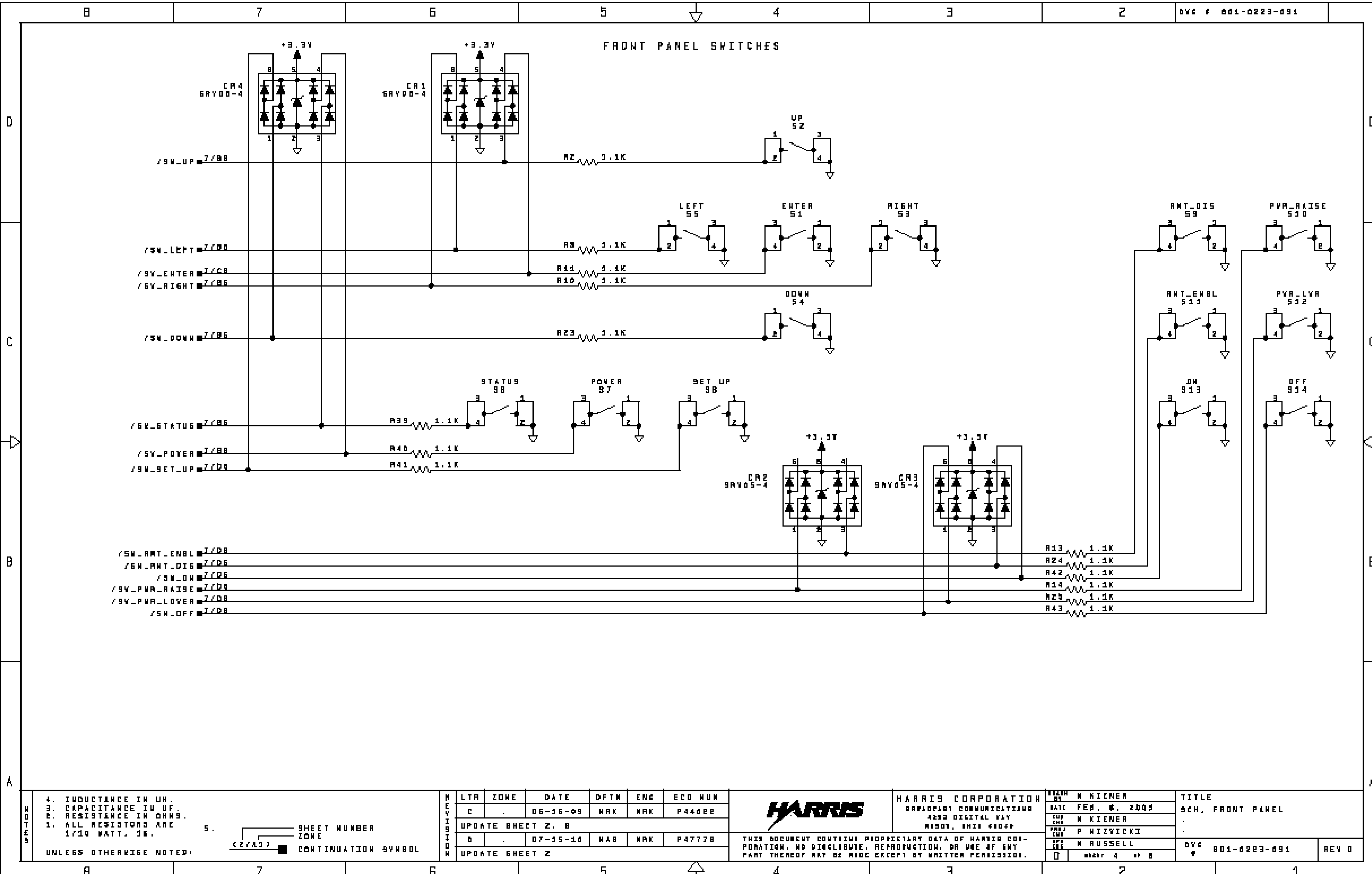
DRAWN BY: W KIENER
DATE: FEB. 6, 2009
CHK: W KIENER
PROJ ENG: P WIZVICKI
APP: W RUSSELL
D SHEET 1 OF 8

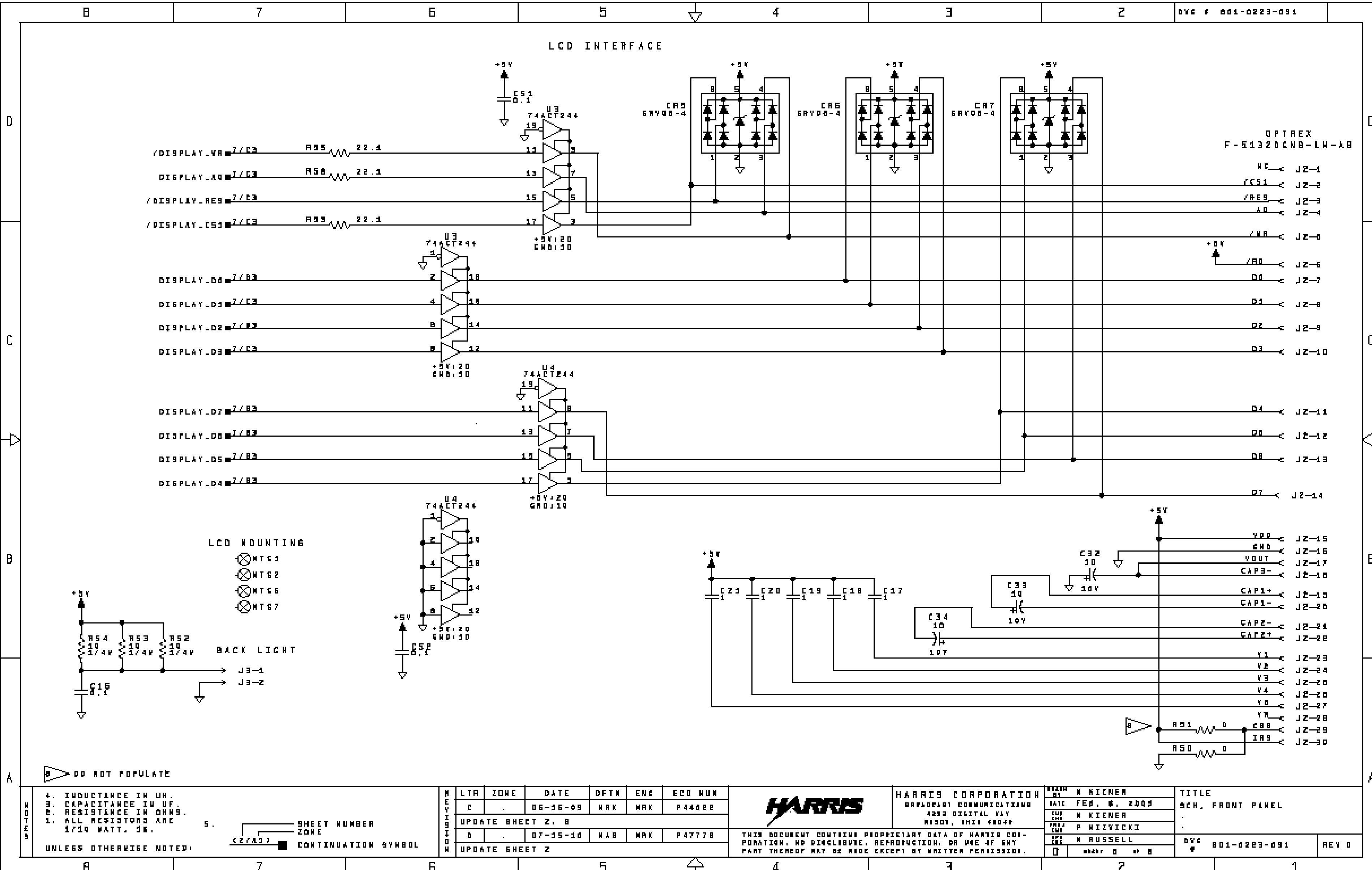
TITLE
SCH, FRONT PANEL

DWG # 801-0223-091 REV D

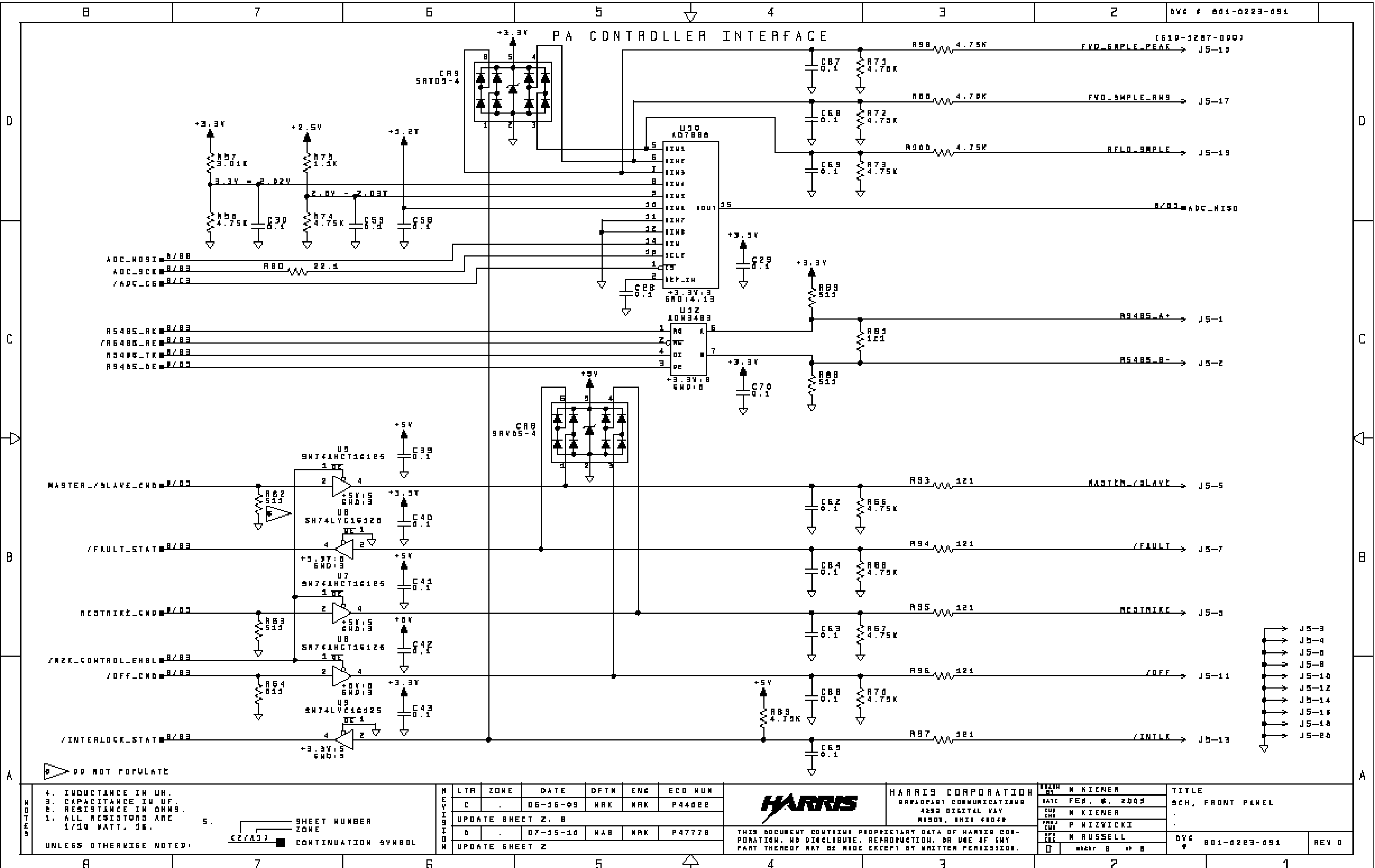

SIGNAL PROCESSING INTERFACE
FPGA TO HAVE INTERNAL PULLUPS
FPGA JTAG
DO NOT POPULATE
'0000' - STANDARD UEP
'0001' - UEP FP WITH DISPLAY
'0010' - MICRON FP
HARRIS CORPORATION
TITLE
SCH, FRONT PANEL
UNLESS OTHERWISE NOTED:
CONTINUATION SYMBOL
SHEET NUMBER
ZONE

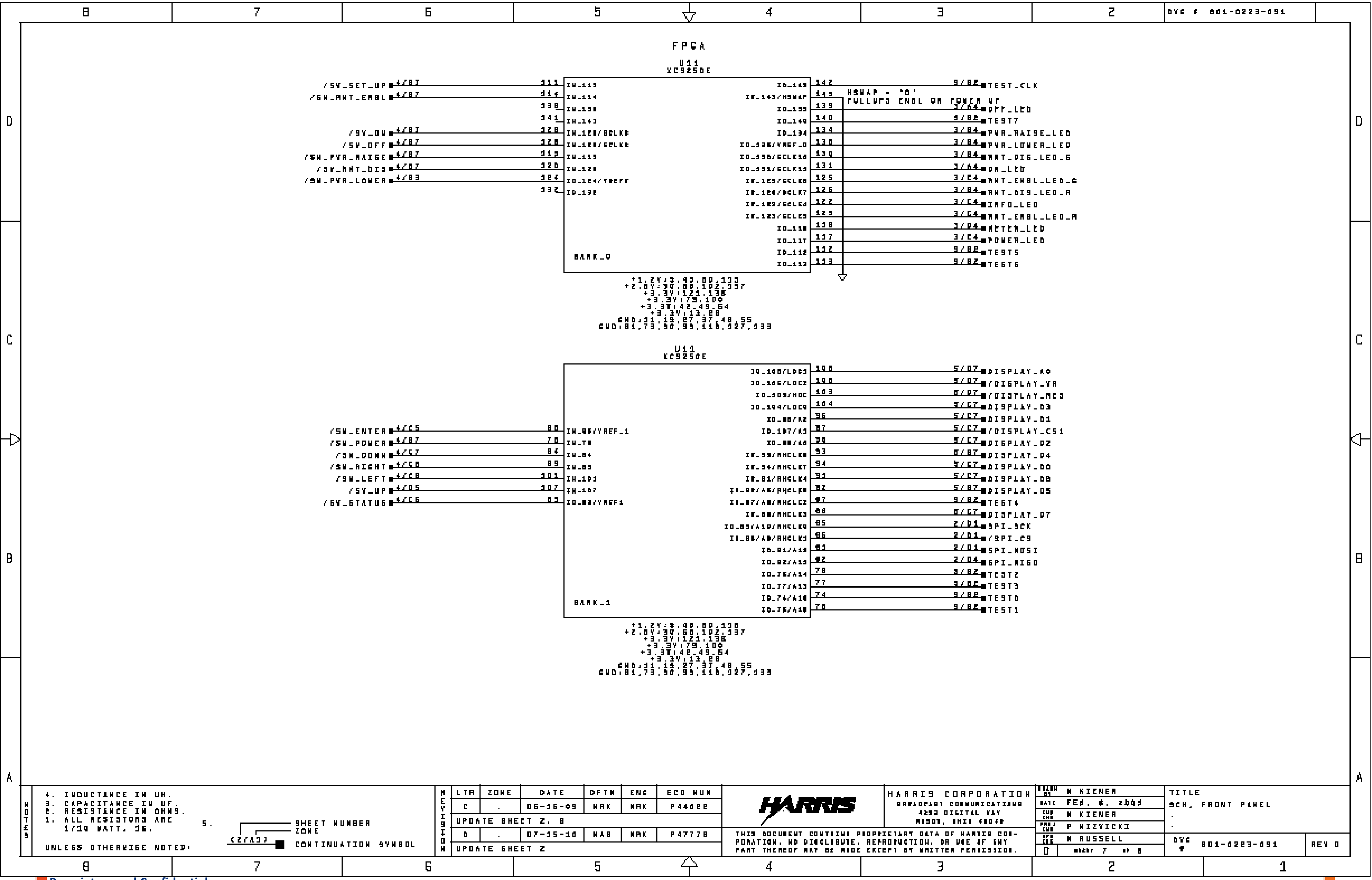

FRONT PANEL LEDS
STATUS LEDS
BUTTON LEDS
HARRIS CORPORATION
TITLE
SCH, FRONT PANEL

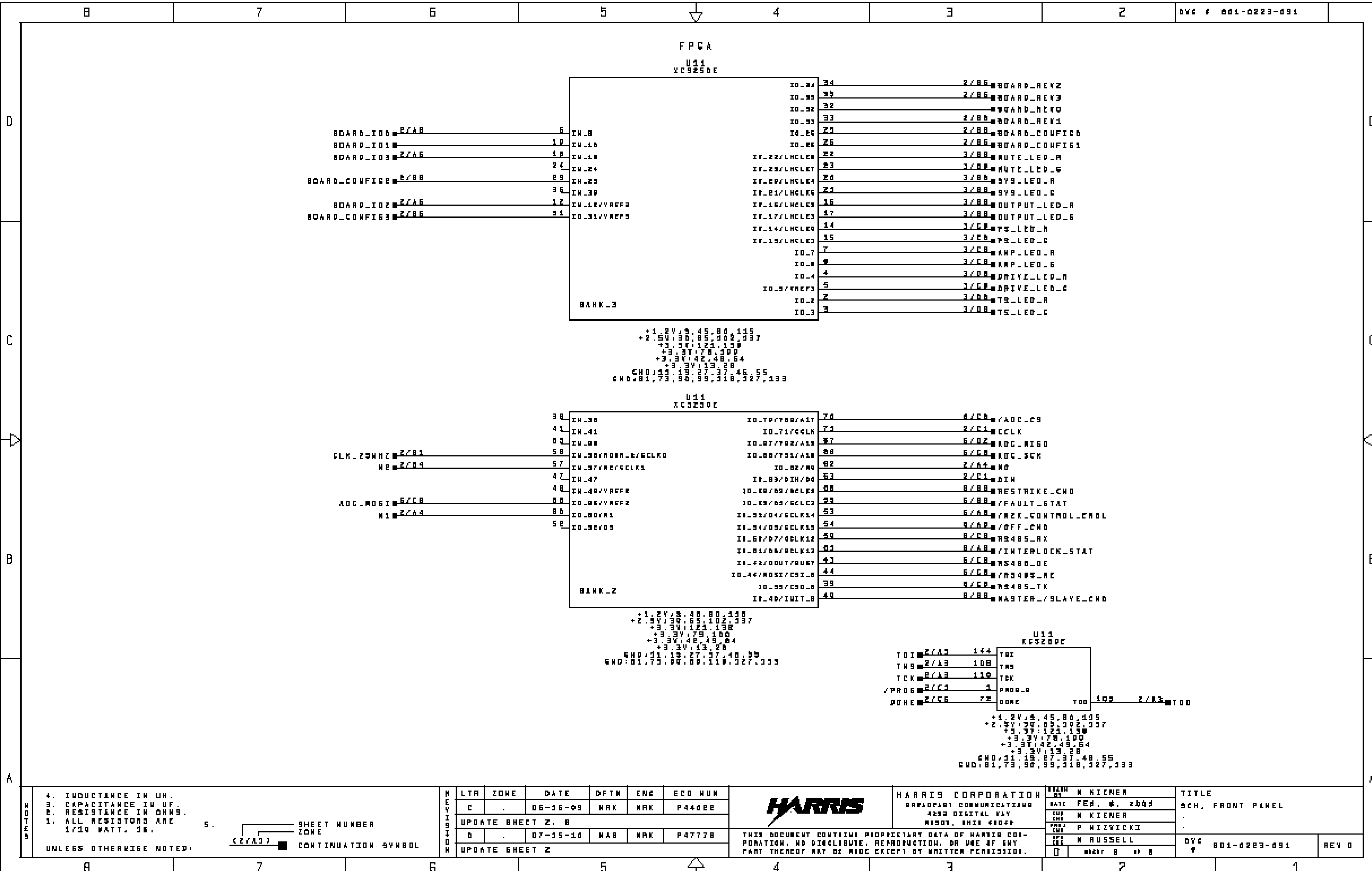

FRONT PANEL SWITCHES
UP S2
LEFT S5
ENTER S1
RIGHT S3
DOWN S4
STATUS S6
POWER S7
SET UP S8
ANT_DIS S9
PWR_RAISE S10
ANT_ENBL S11
PWR_LWR S12
ON S13
OFF S14
/SW_UP
/SW_LEFT
/SW_ENTER
/SW_RIGHT
/SW_DOWN
/SW_STATUS
/SW_POWER
/SW_SET_UP
/SW_ANT_ENBL
/SW_ANT_DIS
/SW_ON
/SW_PWR_RAISE
/SW_PWR_LOWER
/SW_OFF
HARRIS CORPORATION
TITLE
SCH, FRONT PANEL
801-0223-091

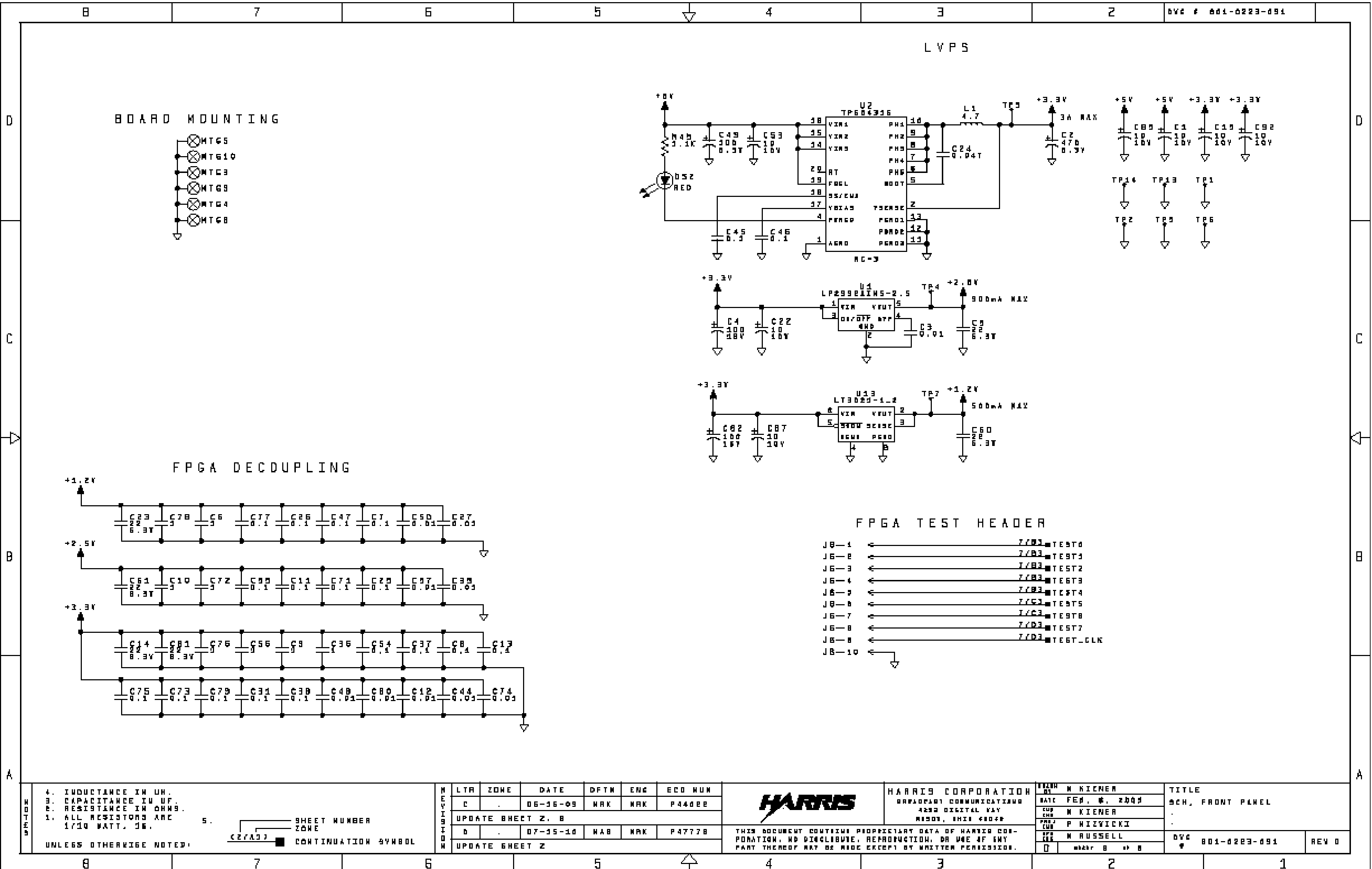


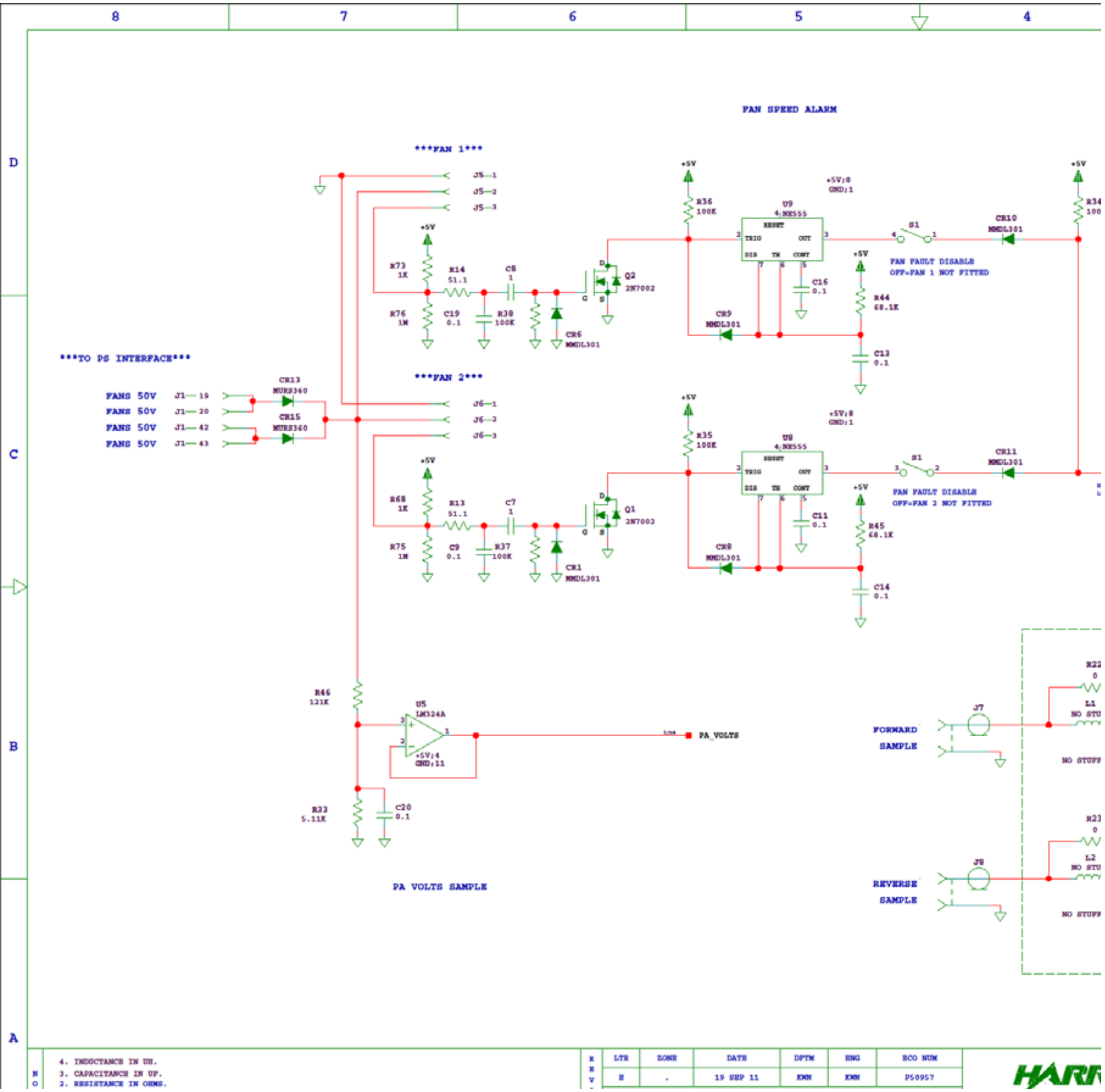
LCD INTERFACE
OPTREX
F-51320GNB-LW-AB
/DISPLAY_WR
DISPLAY_A0
/DISPLAY_RES
/DISPLAY_CS1
DISPLAY_D0
DISPLAY_D1
DISPLAY_D2
DISPLAY_D3
DISPLAY_D7
DISPLAY_D6
DISPLAY_D5
DISPLAY_D4
74ACT244
LCD MOUNTING
BACK LIGHT
DO NOT POPULATE
4. INDUCTANCE IN UH.
3. CAPACITANCE IN UF.
2. RESISTANCE IN OHMS.
1. ALL RESISTORS ARE 1/10 WATT, 5%.
UNLESS OTHERWISE NOTED:
SHEET NUMBER
ZONE
CONTINUATION SYMBOL
UPDATE SHEET 2, 8
UPDATE SHEET 2
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TITLE
SCH, FRONT PANEL
DWG 801-0223-091

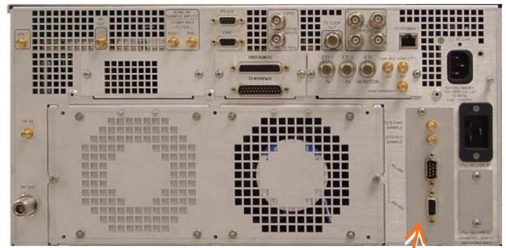

PA CONTROLLER INTERFACE
HARRIS CORPORATION
TITLE
SCH, FRONT PANEL
DO NOT POPULATE
UNLESS OTHERWISE NOTED:
1. ALL RESISTORS ARE 1/10 WATT, 5%.
2. RESISTANCE IN OHMS.
3. CAPACITANCE IN UF.
4. INDUCTANCE IN UH.
SHEET NUMBER
ZONE
CONTINUATION SYMBOL
UPDATE SHEET 2, 8
UPDATE SHEET 2


FPGA
BANK_0
BANK_1
HARRIS
HARRIS CORPORATION

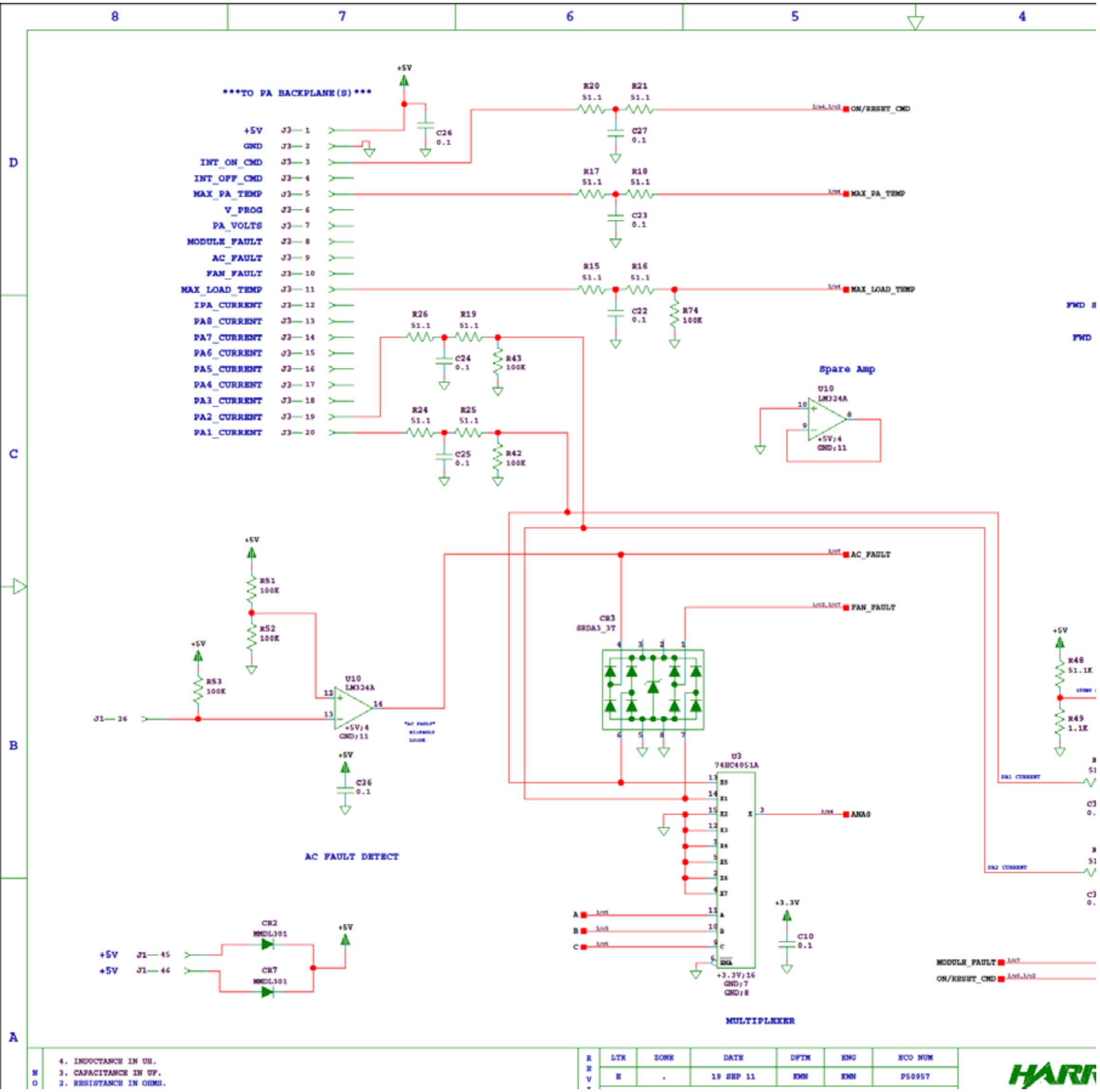

FPGA
U11
BANK_3
BANK_2
HARRIS CORPORATION
TITLE
SCH, FRONT PANEL
DWG # 801-0223-091
UNLESS OTHERWISE NOTED:
CONTINUATION SYMBOL
SHEET NUMBER
ZONE


LVPS
BOARD MOUNTING
FPGA DECOUPLING
FPGA TEST HEADER
HARRIS CORPORATION
TITLE
SCH, FRONT PANEL
801-0223-091

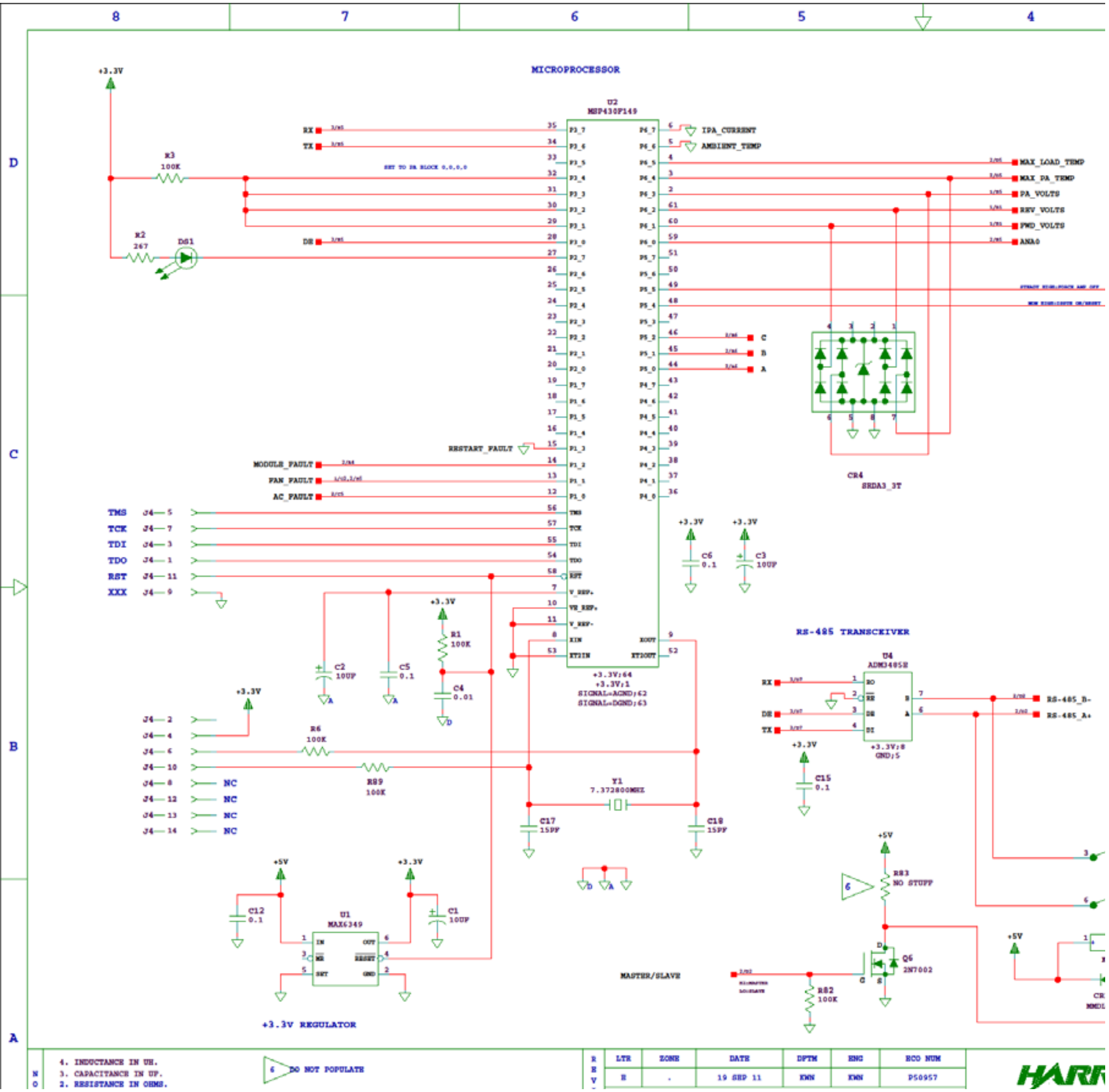


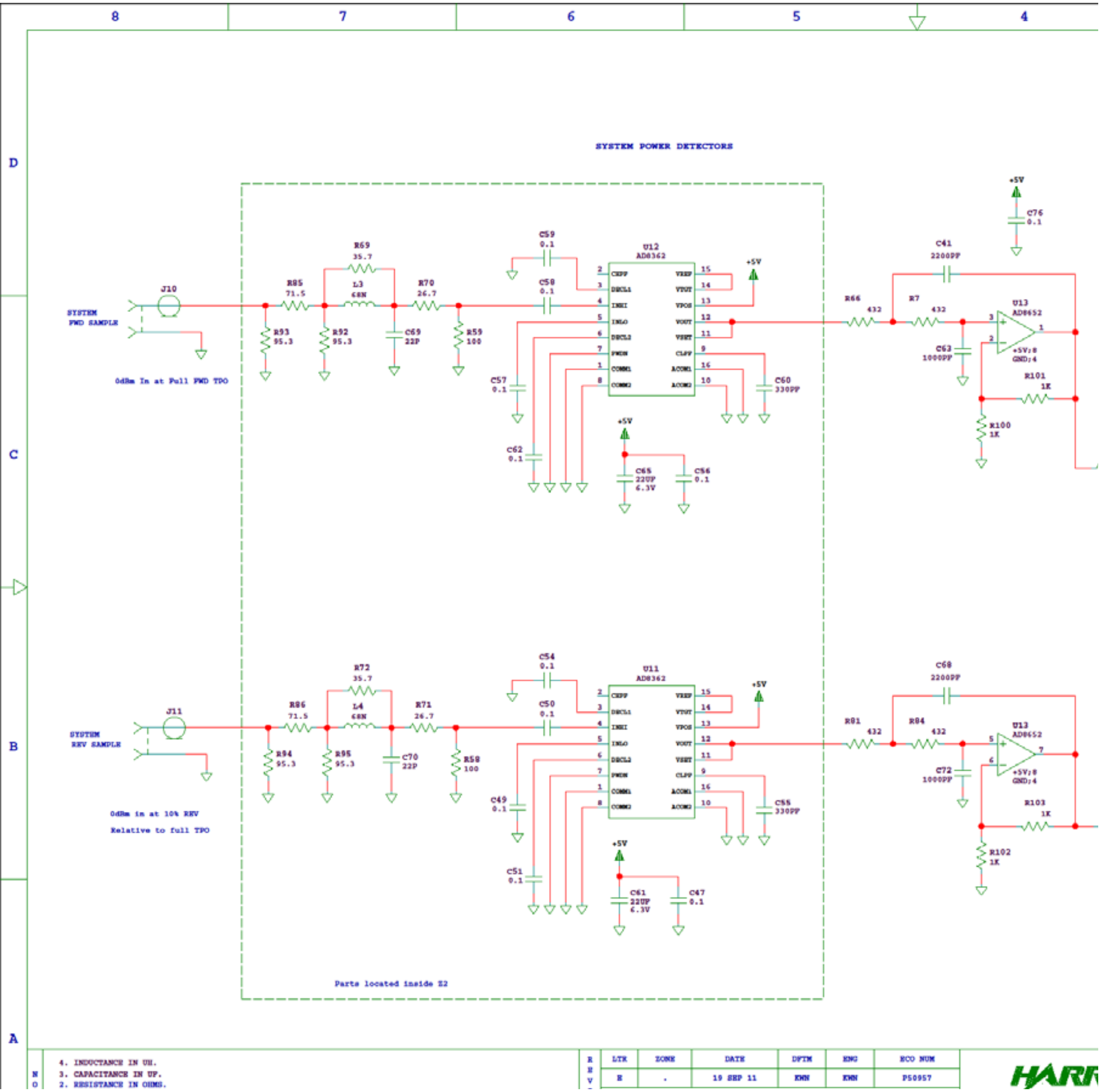


Amp Control board

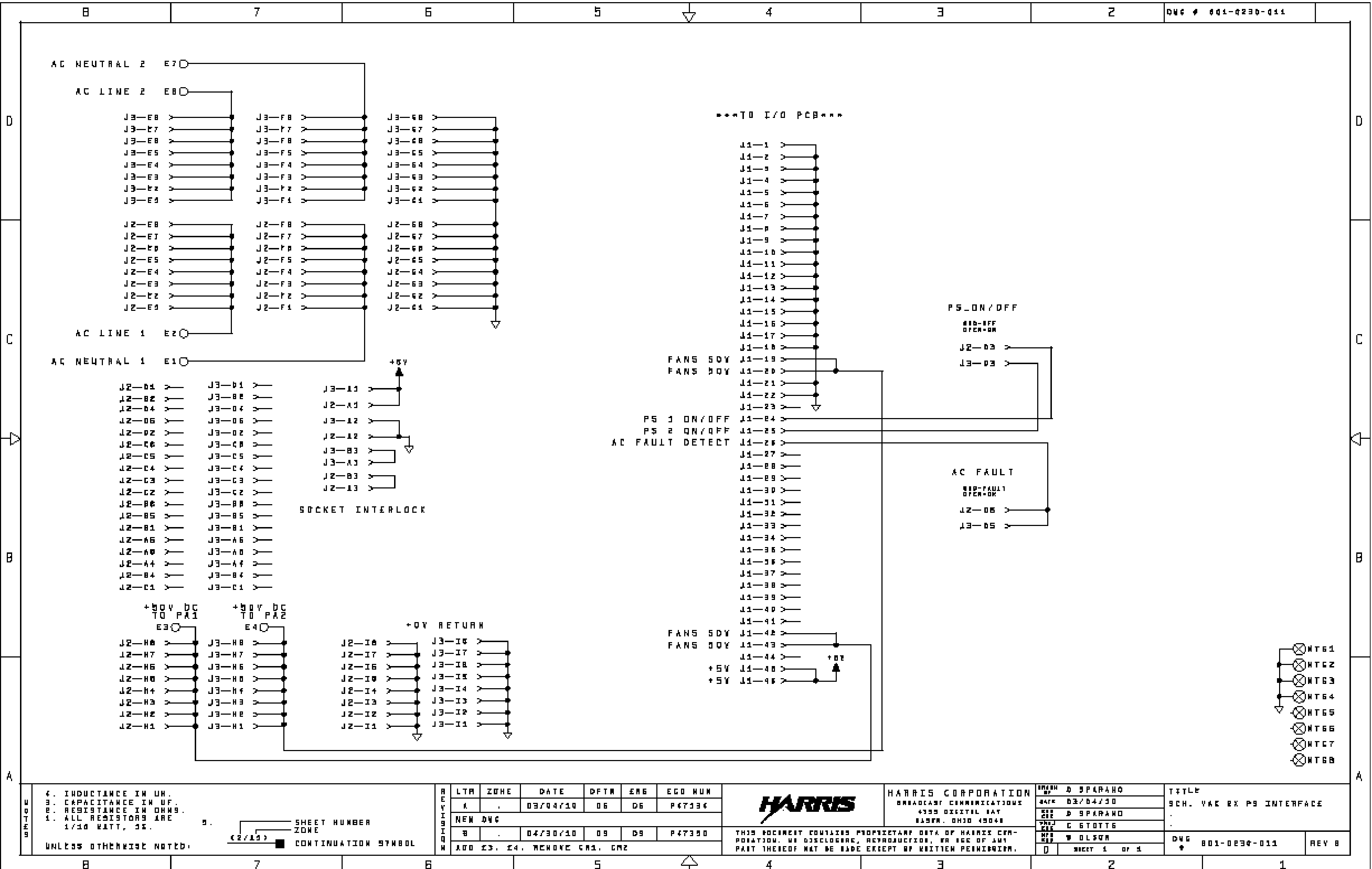


TO PA BACKPLANE(S)
ON/RESET_CMD
MAX_PA_TEMP
MAX_LOAD_TEMP
Spare Amp
AC_FAULT
FAN_FAULT
ANA0
AC FAULT DETECT
MULTIPLEXER
4. INDUCTANCE IN UH.
3. CAPACITANCE IN UF.
2. RESISTANCE IN OHMS.

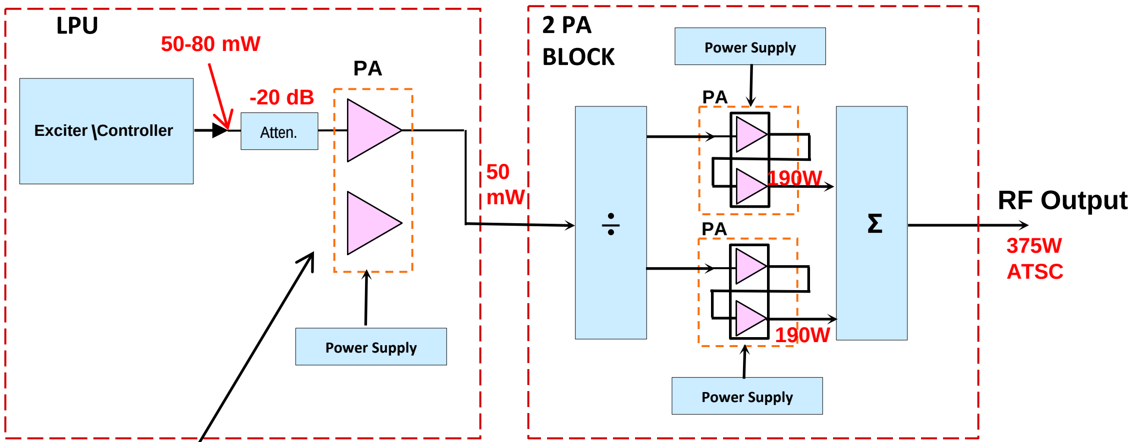




SYSTEM POWER DETECTORS
SYSTEM FWD SAMPLE
0dBm In at Full FWD TPO
SYSTEM REV SAMPLE
0dBm in at 10% REV
Relative to full TPO
U12 AD8362
U11 AD8362
U13 AD8652
Parts located inside S2
4. INDUCTANCE IN UH.
3. CAPACITANCE IN UF.
2. RESISTANCE IN OHMS.
LTR
ZONE
DATE
DFTM
ENG
ECO NUM
B
19 SEP 11
KWN
P50957


AC NEUTRAL 2 E7
AC LINE 2 E8
AC LINE 1 E2
AC NEUTRAL 1 E1
+5V
SOCKET INTERLOCK
+50V DC TO PA1 E3
+50V DC TO PA2 E4
+0V RETURN
TO I/O PCB
FANS 50V
PS 1 ON/OFF
PS 2 ON/OFF
AC FAULT DETECT
+5V
PS_ON/OFF
AC FAULT
HARRIS CORPORATION
HARRIS
TITLE
SCH. VAX 2X PS INTERFACE
DWG 801-0230-011
REV B
UNLESS OTHERWISE NOTED:
CONTINUATION SYMBOL
SHEET NUMBER
ZONE

BLOCK DIAGRAM VAX 2 PA SYSTEM



Power levels (pre-filter)	Cascaded PA's
TV COFDM:	**200 W**
DAB:	**300 W**
ATSC:	**375 W**
Analog:	**500 W**

All 3 PA modules identical.

One PA Modules (2 pallets with one FET each). Low output power, little chance of failure.

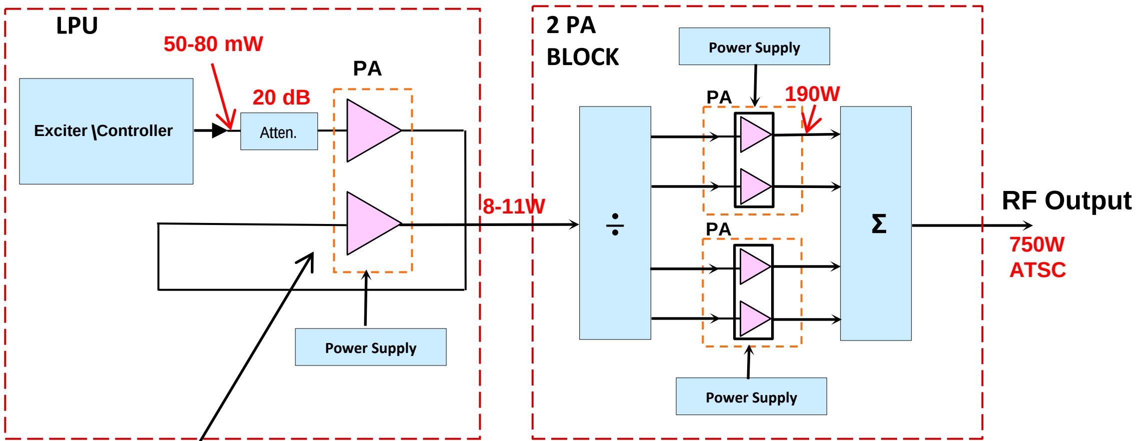


10 RU

LPU output varies to change Tx output

PS or amp pallet failure in LPU causes no output.

BLOCK DIAGRAM VAX 2 PA SYSTEM



Power levels (pre-filter)

	Parallel PA's
TV COFDM:	400 W
DAB:	600 W
ATSC:	750 W
Analog:	1 kW

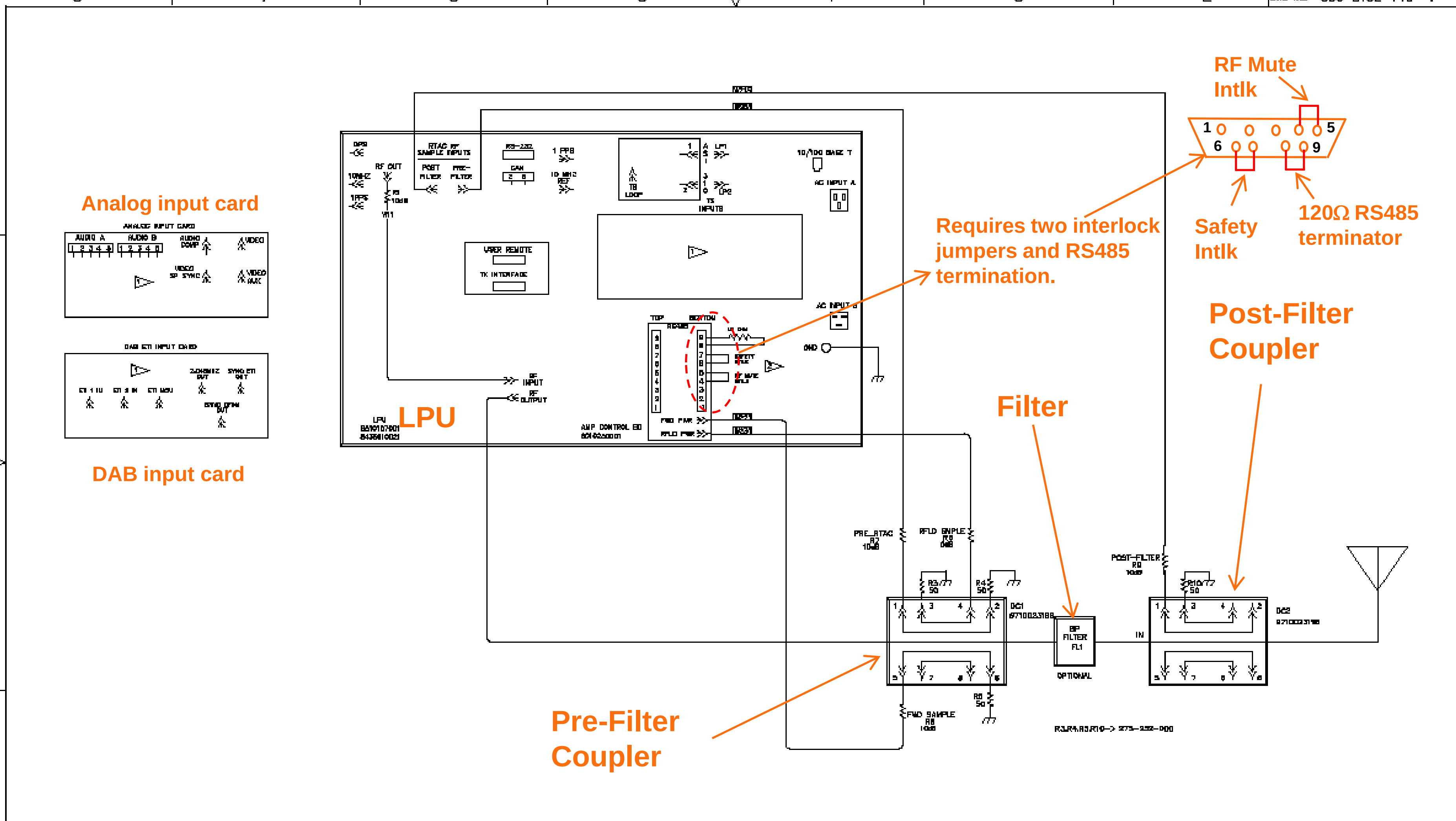
All 3 PA modules identical.

One PA Modules (2 pallets with one FET each). Low output power, little chance of failure.



LPU output varies to change Tx output

PS or amp pallet failure in LPU causes no output.



NOTES

1. ANALOG INPUT CARD ONLY PRESENT FOR ANALOG MODULATION AND ETI DAB INPUT CARD ONLY PRESENT FOR DAB MODULATION
2. CONNECT RS-485 TERM PLUG 852-8282-034 TO J4. THIS ALSO INCLUDES INTERLOCK AND RF MUTE JUMPERS

REVISION

LTR	ZONE	DATE	DFTN	ENG	ECO NBR
A	-	-	CMS	CMS	NEW DWG
-					
B	-	12/8/11	CMS	CMS	P51690

Added page 3

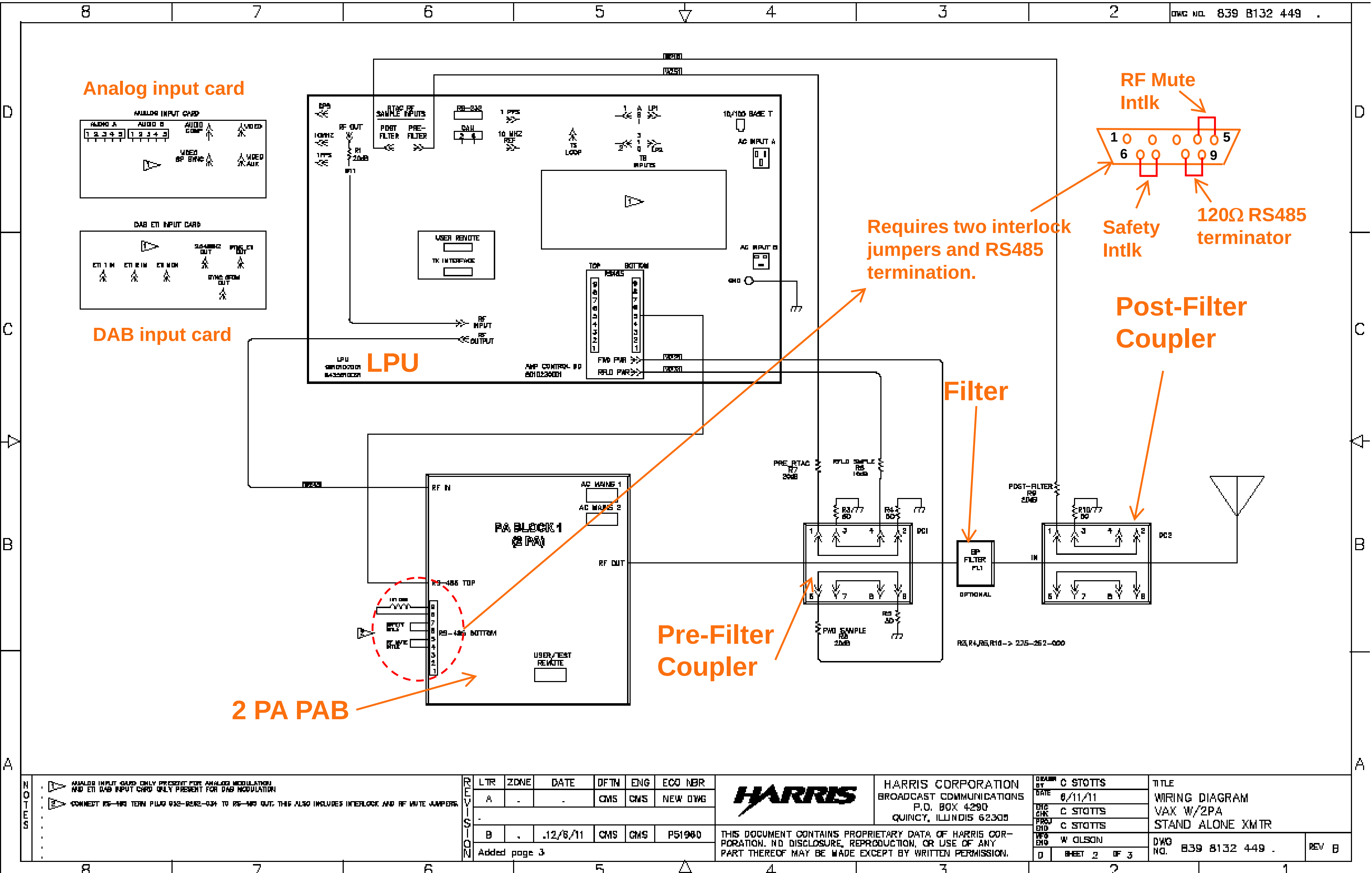
HARRIS

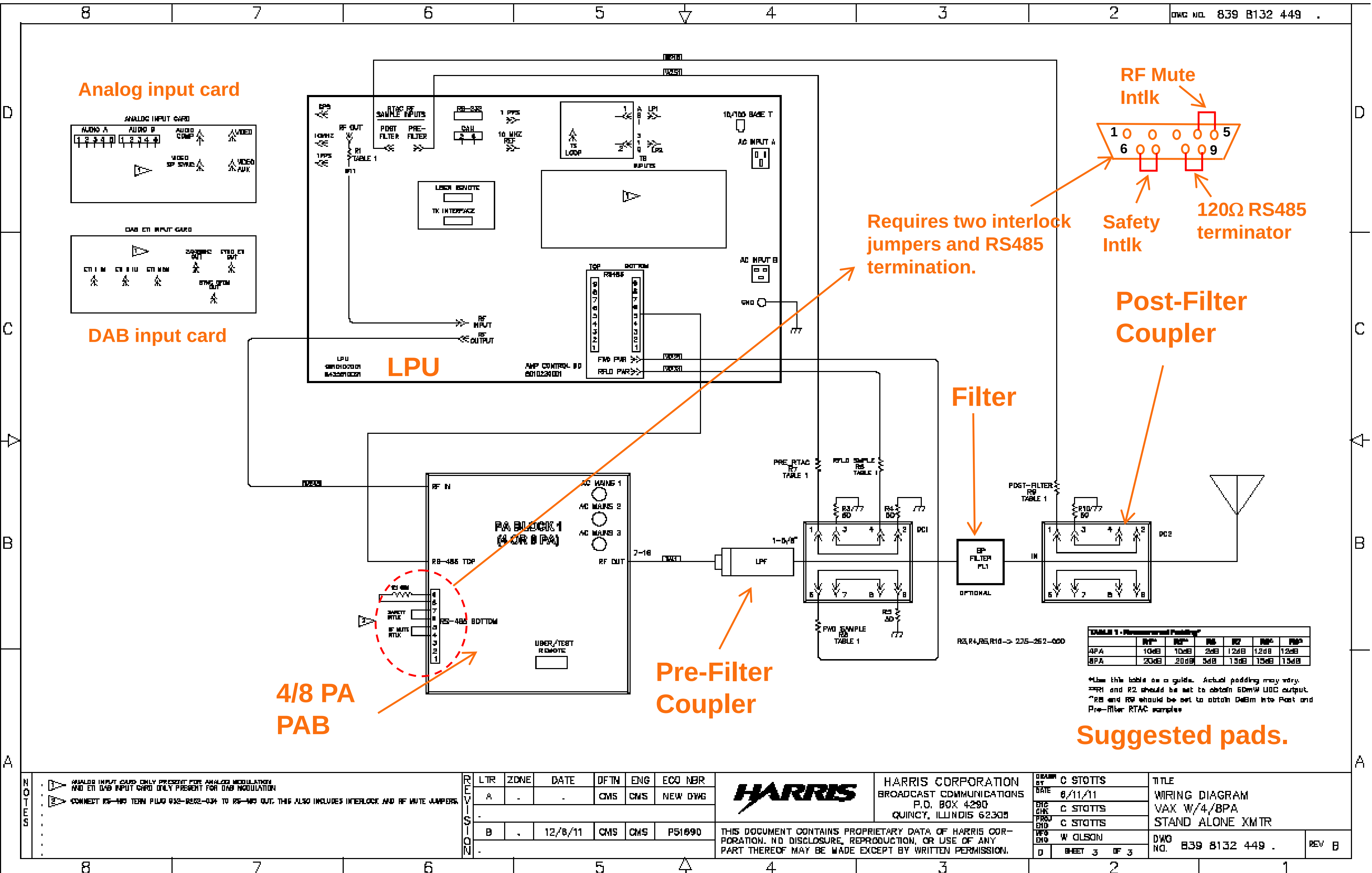
HARRIS CORPORATION
BROADCAST COMMUNICATIONS
P.O. BOX 4290
QUINCY, ILLINOIS 62305

DRAWN BY: C STOTTS
DATE: 8/11/11
ENG CHK: C STOTTS
PROJ ENG: C STOTTS
MFG ENG: W OLSON
D SHEET 1 OF 3

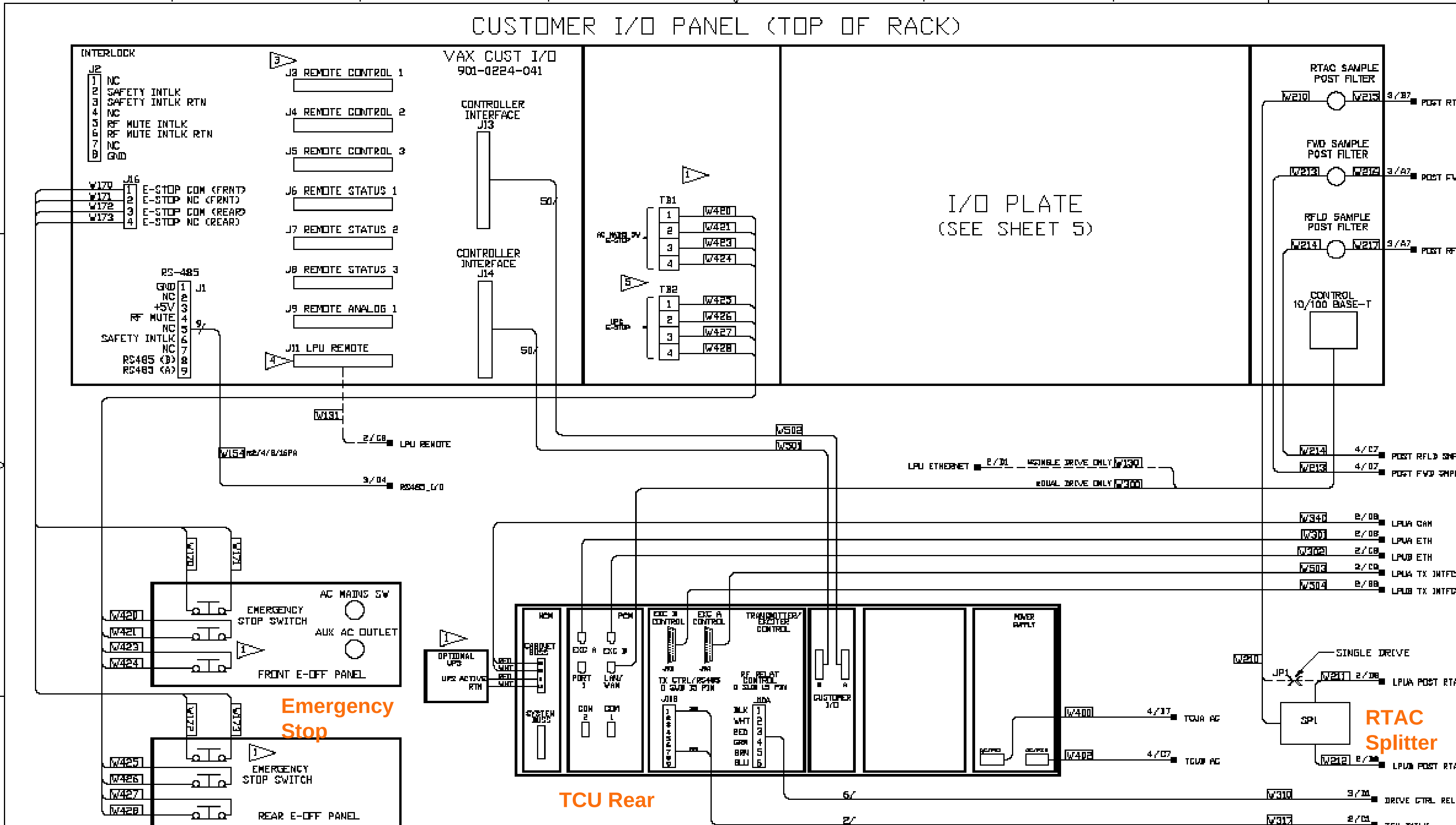
TITLE: WIRING DIAGRAM VAX LPU STAND ALONE XMTR

DWG NO. 839 8132 449 . REV B


Analog input card
DAB input card
LPU
RF Mute Intlk
Safety Intlk
120Ω RS485 terminator
Requires two interlock jumpers and RS485 termination.
Post-Filter Coupler
Filter
Pre-Filter Coupler
2 PA PAB
PA BLOCK 1 (2 PA)
RF IN
RF OUT
AC MAINS 1
AC MAINS 2
RS-485 TOP
RS-485 BOTTOM
USER/TEST REMOTE
BP FILTER FL1
OPTIONAL
R3,R4,R5,R10-> 275-252-000
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TITLE WIRING DIAGRAM VAX W/2PA STAND ALONE XMTR
DWG NO. 839 8132 449
REV B
SHEET 2 OF 3
DRAWN BY C STOTTS
DATE 6/11/11
ENG CHK C STOTTS
PROJ ENG C STOTTS
MFG ENG W OLSON
LTR ZONE DATE DFTN ENG ECO NBR
A - - CMS CMS NEW DWG
B - 12/6/11 CMS CMS P51960
Added page 3


Analog input card
DAB input card
LPU
RF Mute Intlk
Requires two interlock jumpers and RS485 termination.
Safety Intlk
120Ω RS485 terminator
Post-Filter Coupler
Filter
Pre-Filter Coupler
4/8 PA PAB
Suggested pads.
PA BLOCK 1 (4 OR 8 PA)
RS-485 TOP
RS-485 BOTTOM
USER/TEST REMOTE
RF IN
RF OUT
AC MAINS 1
AC MAINS 2
AC MAINS 3
LPF
BP FILTER FL1
OPTIONAL
DC1
DC2
ANALOG INPUT CARD
DAB ETI INPUT CARD
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TITLE
WIRING DIAGRAM
VAX W/4/8PA
STAND ALONE XMTR
DWG NO. 839 8132 449
REV B

DWG NO. 839 8132 448



NOTES

1. OPTIONAL EQUIPMENT
2. IF FRONT E-STOP IS NOT PRESENT, PINS 2&3 OF JP1 MUST BE JUMPERED. IF REAR E-STOP IS NOT PRESENT, PINS 2&3 OF JP2 MUST BE JUMPERED.
3. SEE SCHEMATIC 801-0224-041 FOR REMOTE CONNECTIONS.
4. LPU REMOTE ONLY USED FOR SINGLE DRIVE SYSTEMS
5. IF FRONT & REAR E-STOP IS PRESENT, JUMPER TB1-2 TO 3 AND TB2-2 TO 3.

REVISION

LTR	ZONE	DATE	DFTN	ENG	ECO NBR
A	.	..	CMS	CMS	NEW DWG
B	.	8/8/11	CMS	CMS	P50501

Added UPS Option and Cabling

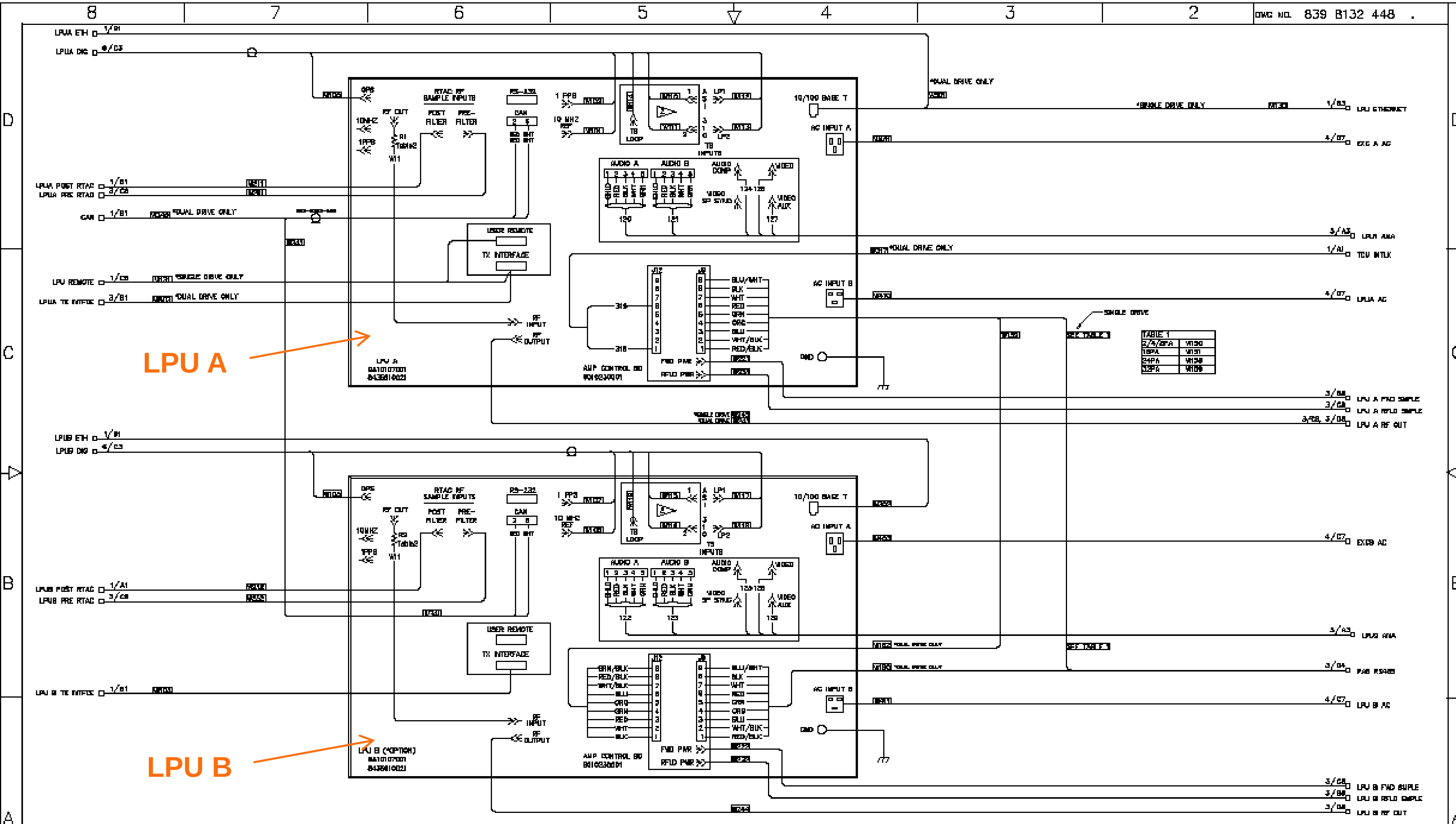
HARRIS CORPORATION
BROADCAST COMMUNICATIONS
P.O. BOX 4290
QUINCY, ILLINOIS 62305

DRAWN BY	C STOTTS
DATE	6/11/11
ENG CHK	C STOTTS
PROJ ENG	C STOTTS
MFG ENG	W OLSON

TITLE
WIRING DIAGRAM
VAX 2 PA / 5RU DELUXE RACK
SINGLE & DUAL DRIVE SYSTEMS

DWG NO. 839 8132 448. REV B

D SHEET 1 OF 5



N O T E S

1. ▷ ANALOG INPUT CARD ONLY PRESENT FOR ANALOG MODULATION.
2. ▷ FOR DAB CONNECT WIRES W10, W11, W15 & W16 TO ETI INPUT 1 & 2 ON DAB INPUT CARD. ALSO CONNECT WIRES W14 & W18 TO ETI MONITOR ON DAB INPUT CARD.

REVISIONS

LTR	ZONE	DATE	DFTN	ENG	ECO NBR
A	-	-	CMS	CMS	NEW DWG
B	-	6/11/11	CMS	CMS	P50501

REVISE PAGE 1

HARRIS

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BROADCAST COMMUNICATIONS
P.O. BOX 4290
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DRAWN BY: C STOTTS
DATE: 6/11/10
ENG CHK: C STOTTS
PROJ ENG: C STOTTS
MFG ENG: W OLSON

TITLE
WIRING DIAGRAM
VAX 2 PA XMTR
SINGLE & DUAL DRIVE SYSTEMS

DWG NO. 839 8132 448 . REV B
D SHEET 2 OF 5

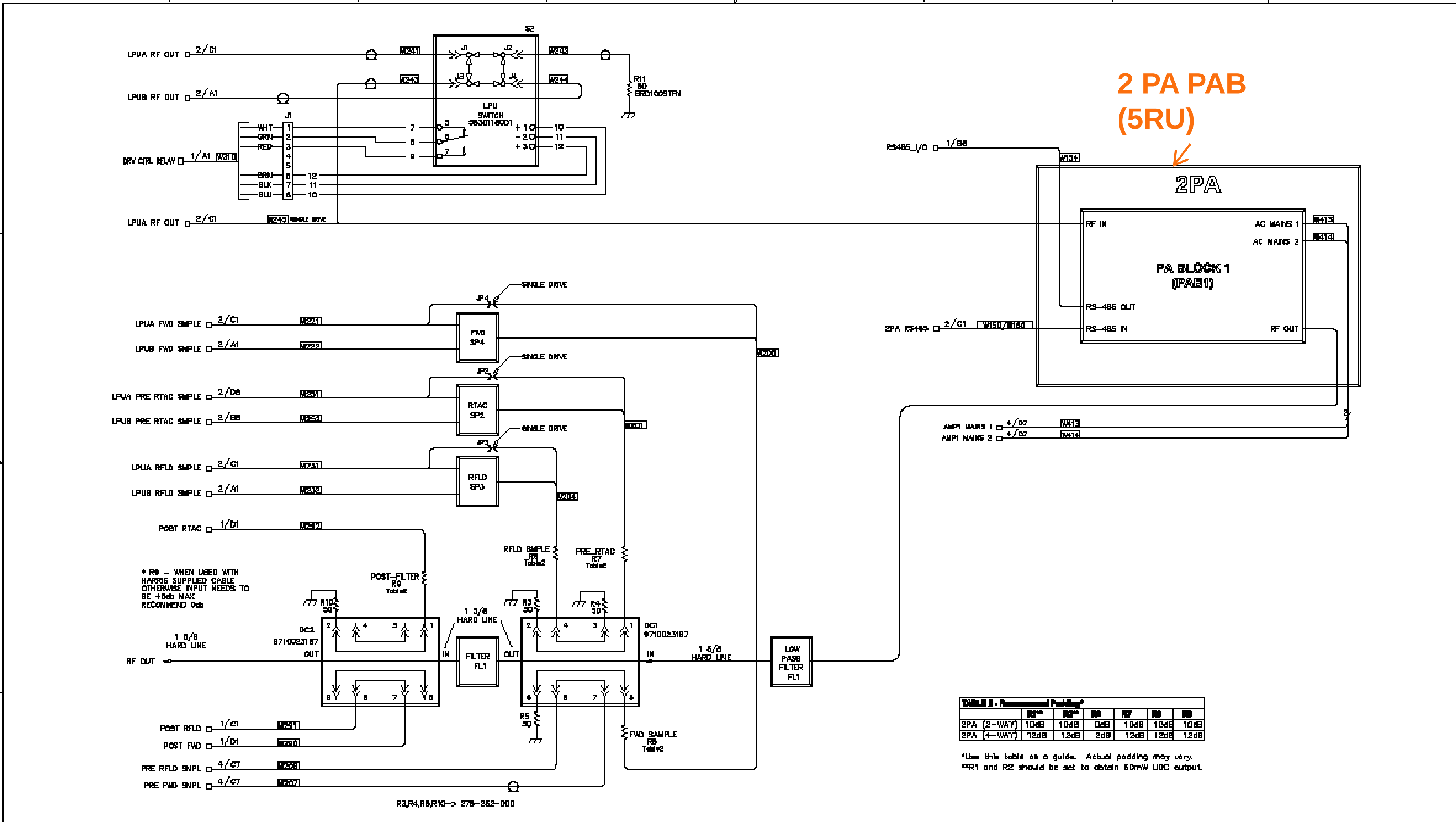


TABLE 1 - Recommended Padding*						
	R1**	R2**	R6	R7	R8	R9
2PA (2-WAY)	10dB	10dB	0dB	10dB	10dB	10dB
2PA (4-WAY)	12dB	12dB	2dB	12dB	12dB	12dB

*Use this table as a guide. Actual padding may vary.
**R1 and R2 should be set to obtain 60mW UDC output.

LTR	ZONE	DATE	DFTN	ENG	ECO NBR
A	.	.	CMS	CMS	NEW DWG
B	.	8/7/11	CMS	CMS	P50501

.Revised Page 1

HARRIS

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P.O. BOX 4290
QUINCY, ILLINOIS 62305

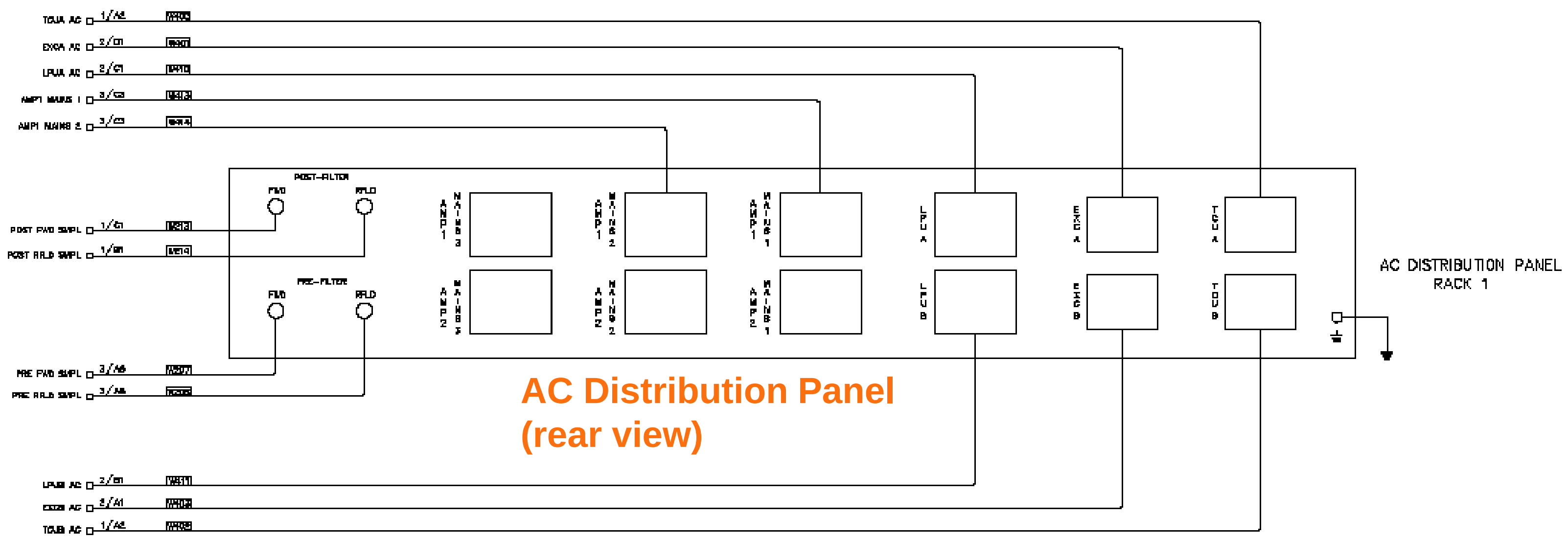
DRAWN BY C STOTTS
DATE 6/20/11
ENG CHK C STOTTS
PROJ ENG C STOTTS
MFG ENG W OLSON

TITLE
WIRING DIAGRAM
VAX-2PA XMTR
SINGLE & DUAL DRIVE SYSTEMS

DWG NO. 839 8132 448 . REV B

D SHEET 3 OF 5

DWG NO. 839 8132 448 .



NOTES

REVISION LTR	ZONE	DATE	DFTN	ENG	ECO NBR
A	.	.	CMS	CMS	NEW DWG
B	.	6/11/11	CMS	CMS	P50501
REVISED PAGE 1					

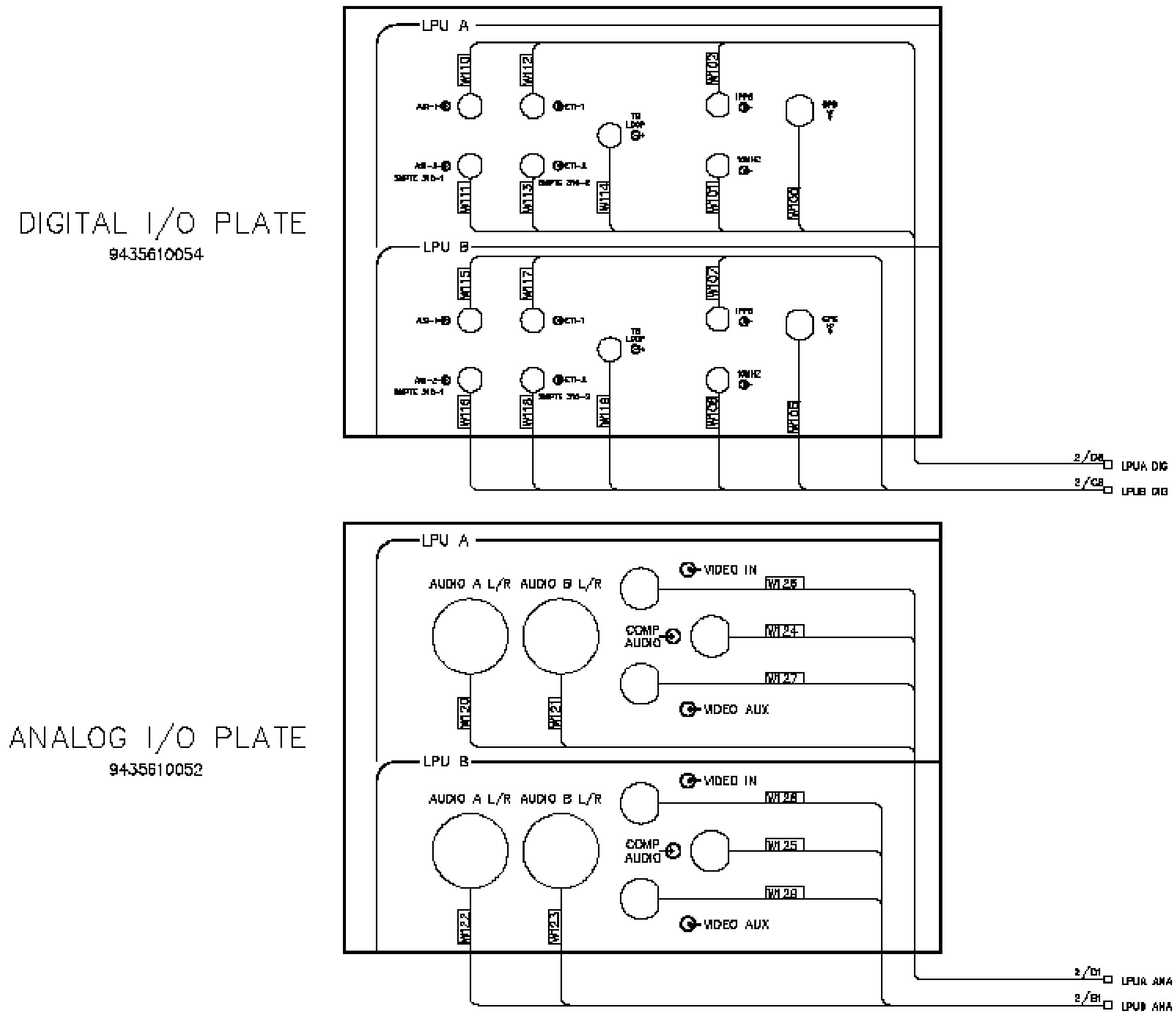
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BROADCAST COMMUNICATIONS
P.O. BOX 4290
QUINCY, ILLINOIS 62305

DRAWN BY C STOTTS
DATE 6/20/11
ENG CHK C STOTTS
PROJ ENG C STOTTS
MFG ENG W OLSON
D SHEET 4 OF 5

TITLE
WIRING DIAGRAM
VAX 2 PA XMTR
SINGLE & DUAL DRIVE SYSTEMS

DWG NO. 839 8132 448 . REV B

DWG NO. 839 8132 448



REVISION	LTR	ZONE	DATE	DFTN	ENG	ECO NBR
	A	-	-	-	-	NEW DWG
	B	-	8/7/11	CMS	CMS	P50501
	Revised Page 1					

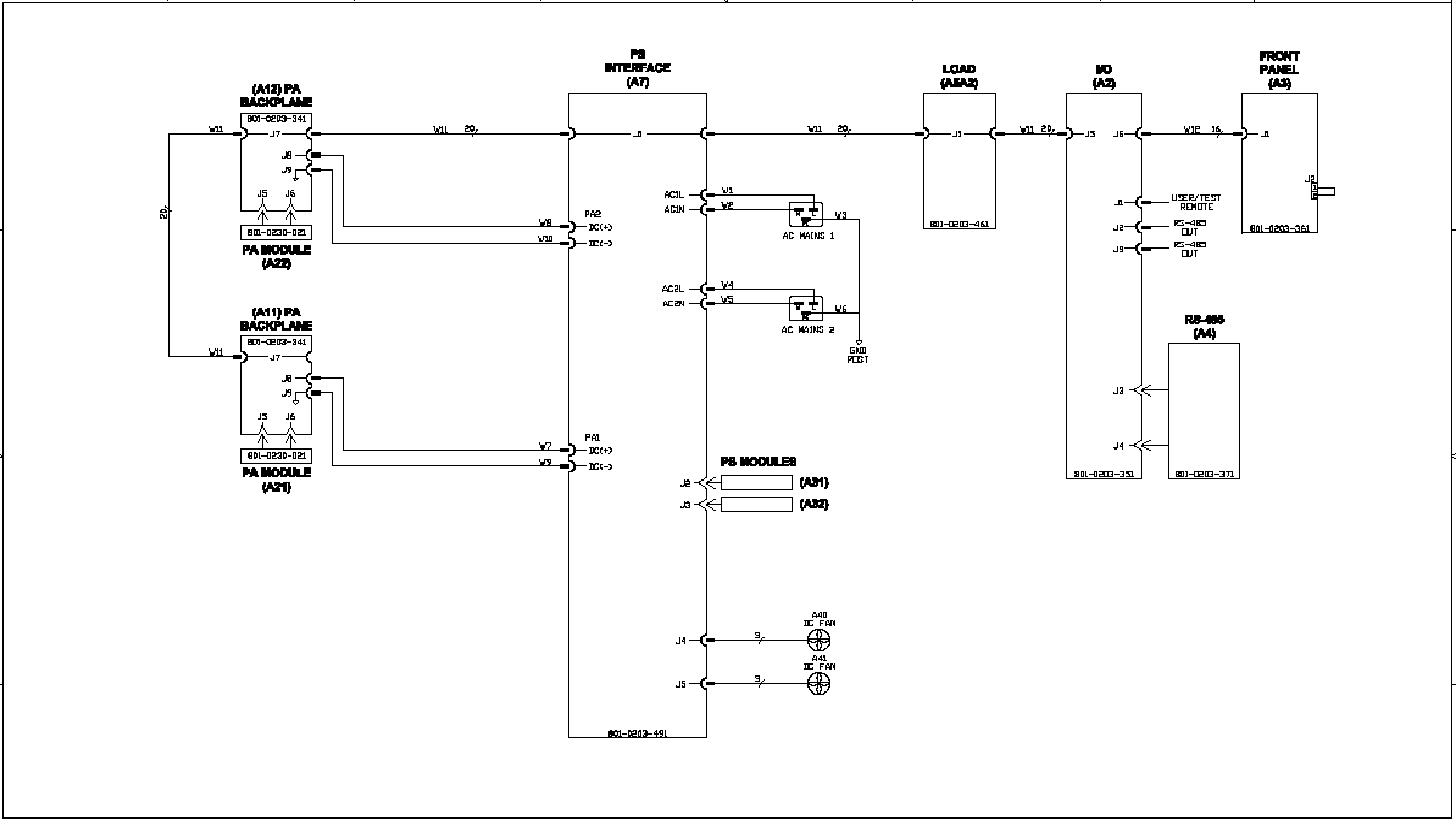
HARRIS

HARRIS CORPORATION
BROADCAST COMMUNICATIONS
P.O. BOX 4290
QUINCY, ILLINOIS 62305

DRAWN BY C STOTTS
DATE 6/20/11
ENG CHK C STOTTS
PROJ ENG C STOTTS
MFG ENG W OLSON
D SHEET 5 OF 5

TITLE
WIRING DIAGRAM
VAX 2 PA XMTR
SINGLE & DUAL DRIVE SYSTEMS

DWG NO. 839 8132 448 . REV B



LTR	ZONE	DATE	DFTM	ENG	ECO NBR
C	.	2/15/12	CMS	CMS	P52109
Revised PA Module Schematic #					
B	.	12/8/11	CMS	CMS	P51690
Removed Keyswitch					

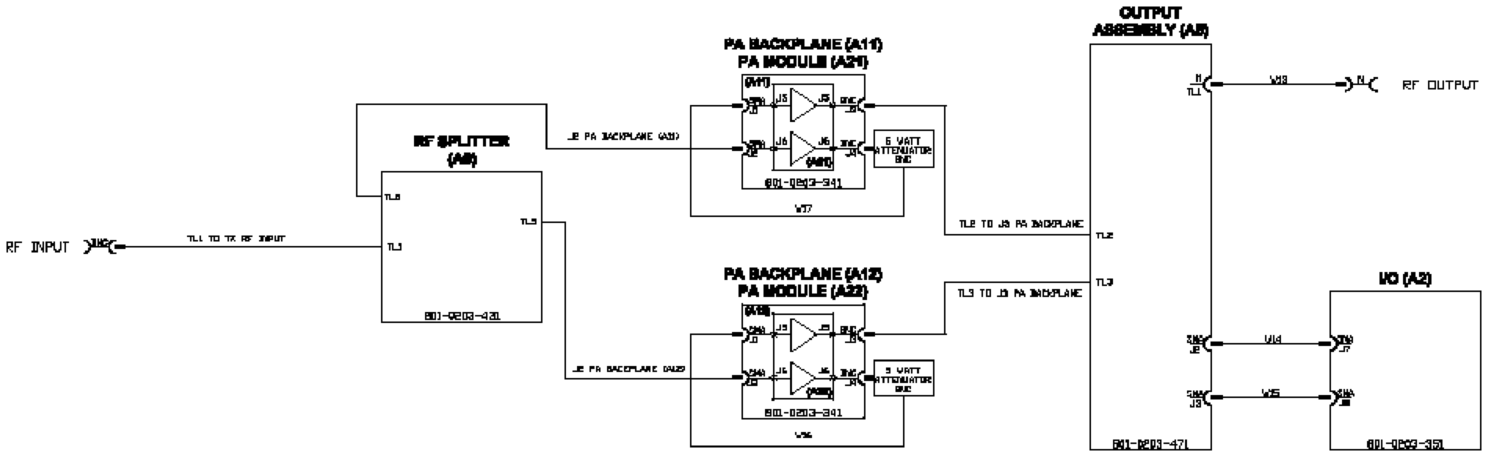
HARRIS CORPORATION
BROADCAST COMMUNICATIONS
P.O. BOX 4290
QUINCY, ILLINOIS 62305

DRAWN BY C STOTTS
DATE 8/20/11
ENG CHK C STOTTS
PROJ ENG C STOTTS
MFG ENG V OLSON
D SHEET 1 OF 1

TITLE
WIRING DIAGRAM
AC-DC INTERCONNECT
VAX-2PA (2-WAY)

DWG NO 839-8464-306 REV C

DWG NO 839-8464-074



NOTES

REVISION	LTR	ZONE	DATE	DFTM	ENG	ECO NBR
	C	.	5/24/11	RMC	RP	P50220
	LABLED WIRES, ADDED ATTENUATORS					
	D	.	12/20/11	CMS	CMS	P51690
	REVISED TITLE					

HARRIS

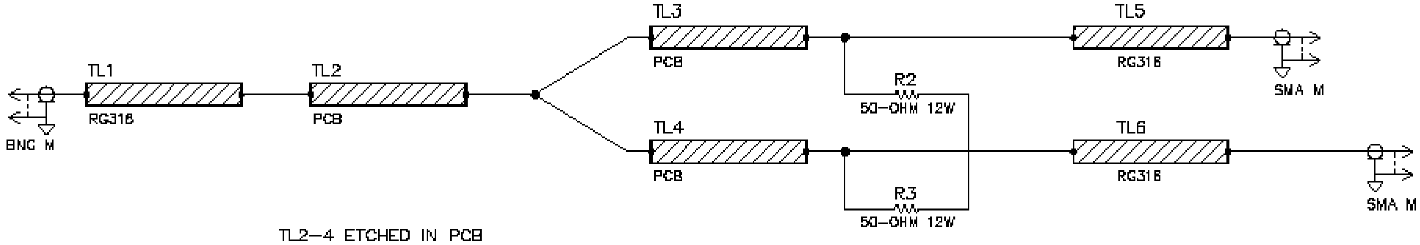
HARRIS CORPORATION
BROADCAST COMMUNICATIONS
P.O. BOX 4290
QUINCY, ILLINOIS 62305

DRAWN BY	D SPARAND
DATE	02/01/08
ENG CHK	D SPARAND
PROD ENG	D SPARAND
MFG ENG	W OLSON
D	SHEET 1 OF 1

TITLE
WIRING DIAGRAM
RF INTERCONNECT
V 670-250/VAX-2PA 2-WAY

DWG NO 839-8464-074 REV D

DWG NO. 801-0203-431



LTR	ZONE	DATE	DFTM	ENG	ECO NBR
A	.	02/06/06	DS	DS	NEW DWG
NEW DWG					

HARRIS

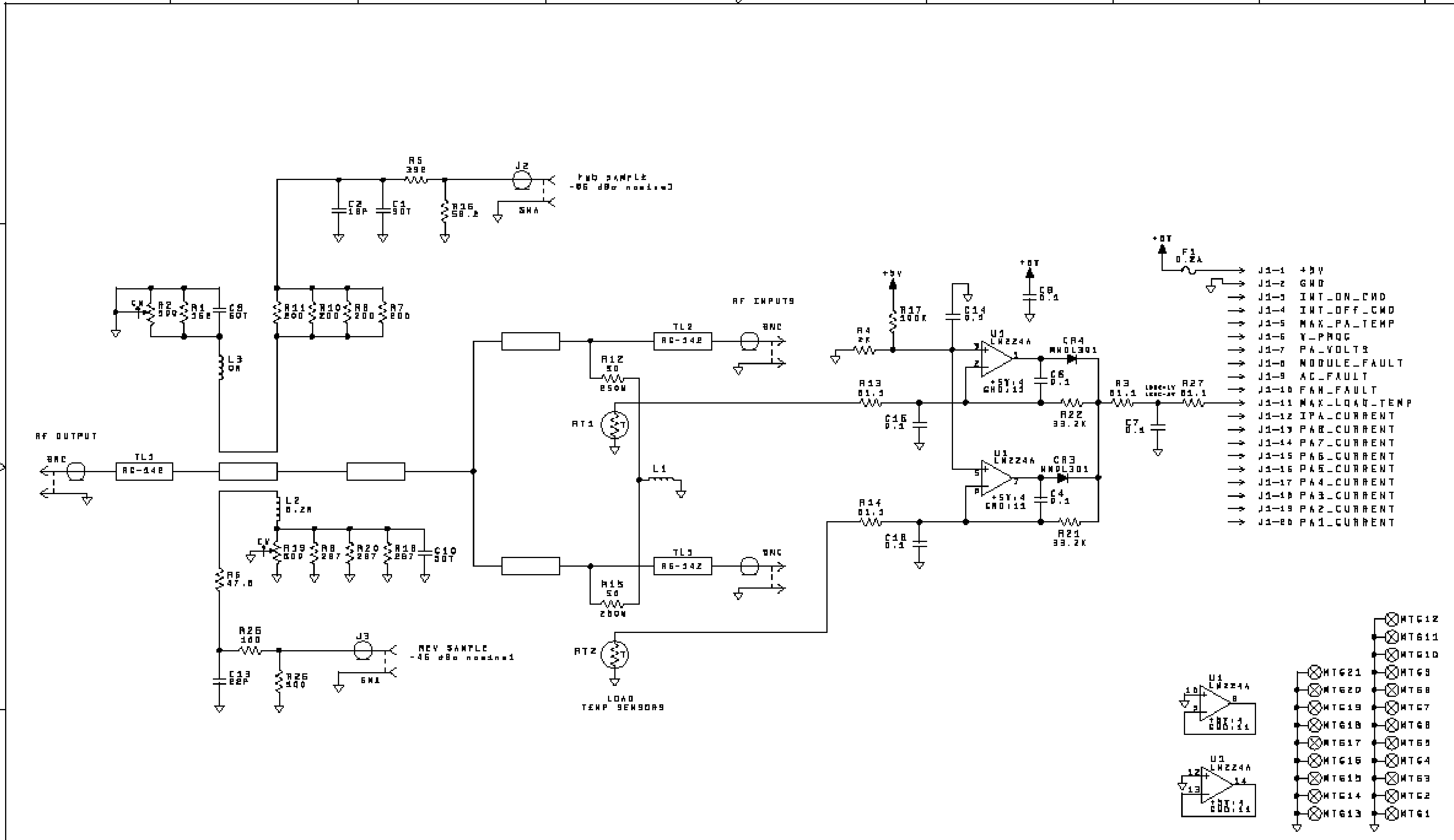
HARRIS CORPORATION
BROADCAST SYSTEMS
P.O. BOX 4290
QUINCY, ILLINOIS 62305

DRAWN BY	D SPARANO
DATE	02/06/06
CHK	D SPARANO
PROJ ENG	D SPARANO
MFG ENG	W OLSON
D	SHEET 1 OF 1

TITLE SCH, BIII 2X SPLITTER

DWG NO. 801-0203-431 REV A

DWG # 801-0203-471



NOTES: UNLESS OTHERWISE NOTED:

1. ALL RESISTORS ARE 1/10 WATT, 5%.
2. RESISTANCE IN OHMS.
3. CAPACITANCE IN UF.
4. INDUCTANCE IN UH.
5. SHEET NUMBER / ZONE (2/15) CONTINUATION SYMBOL

LTR	ZONE	DATE	DFTR	ENG	ECO NUM
C	.	02/18/08	DS	DS	P42466
CHG L2, L3 VALUES					
D	.	04/28/09	DS	DS	P43417
IMPROVE RFI IMMUNITY					

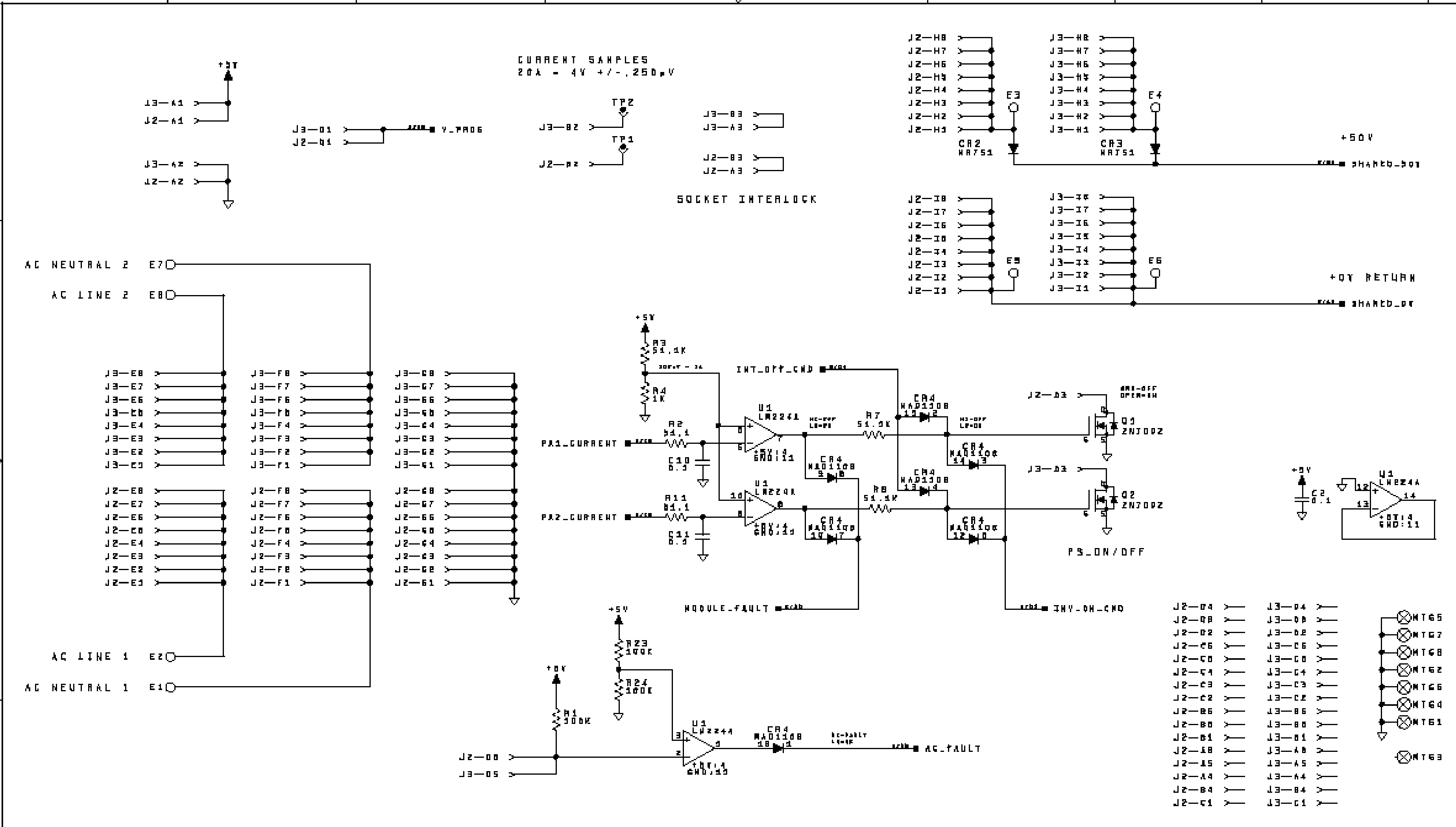
HARRIS

HARRIS CORPORATION
BROADCAST COMMUNICATIONS
4393 DIGITAL WAY
MASON, OHIO 45040

DRAWN D SPRAGUE — DATE 02/10/08 — ENG D SPRAGUE — CHK D SPRAGUE — MFG K OLSON — SIZE D — SHEET 1 OF 1

TITLE: SCH. BIII 2X COMBINER

DWG # 801-0203-471 REV D



	LTR	ZONE	DATE	DFTR	ENG	ECO NUM
	E	.	04/28/08	DG	DG	P43478
	IMPROVE RFI IMMUNITY					
	D	.	06/23/08	DS	DS	P40371
	ADD R1					

NOTES
4. INDUCTANCE IN UH.
3. CAPACITANCE IN UF.
2. RESISTANCE IN OHMS.
1. ALL RESISTORS ARE 1/10 WATT, 5%.
UNLESS OTHERWISE NOTED:

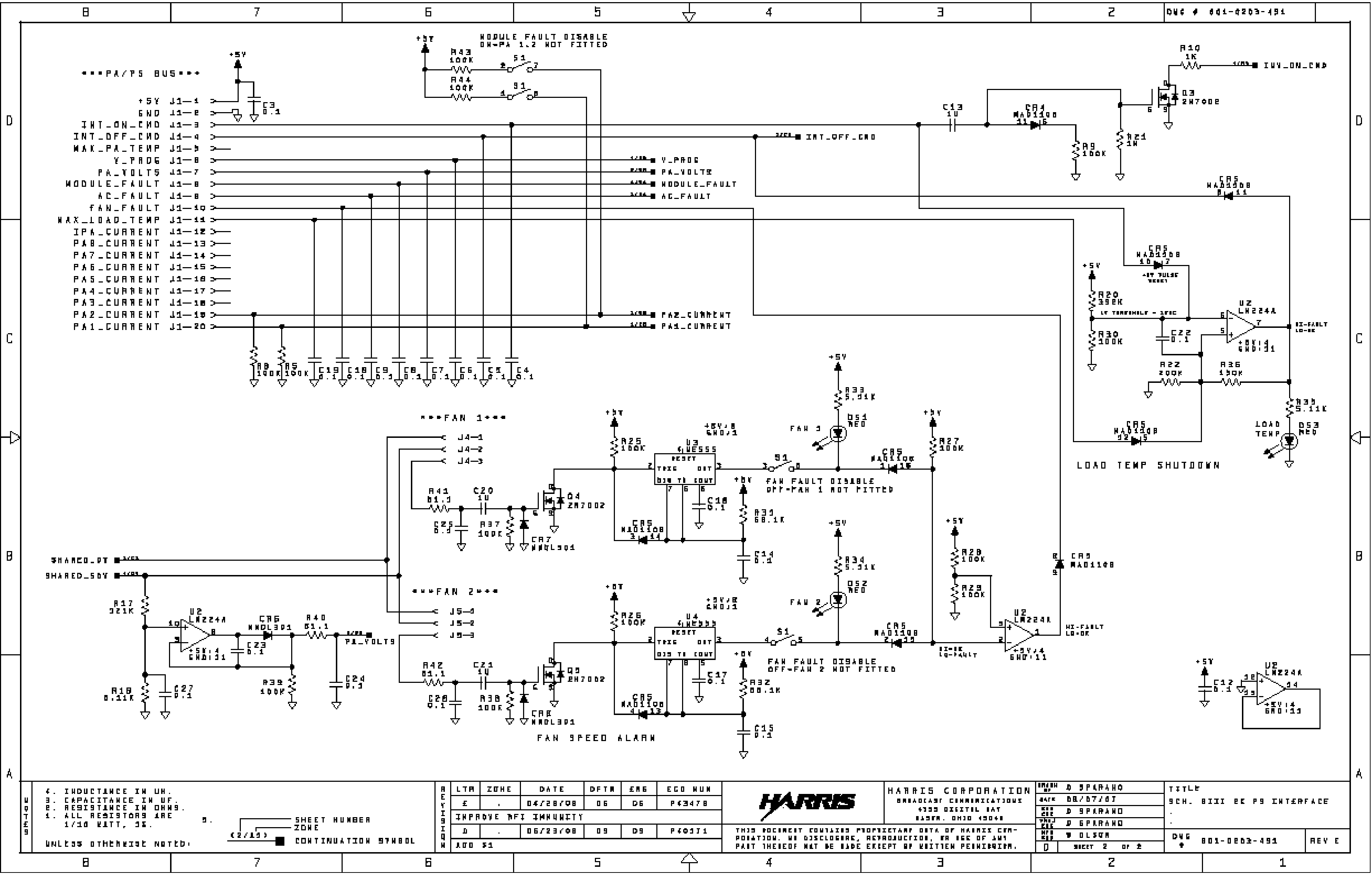
SHEET NUMBER
ZONE
(2/15) CONTINUATION SYMBOL

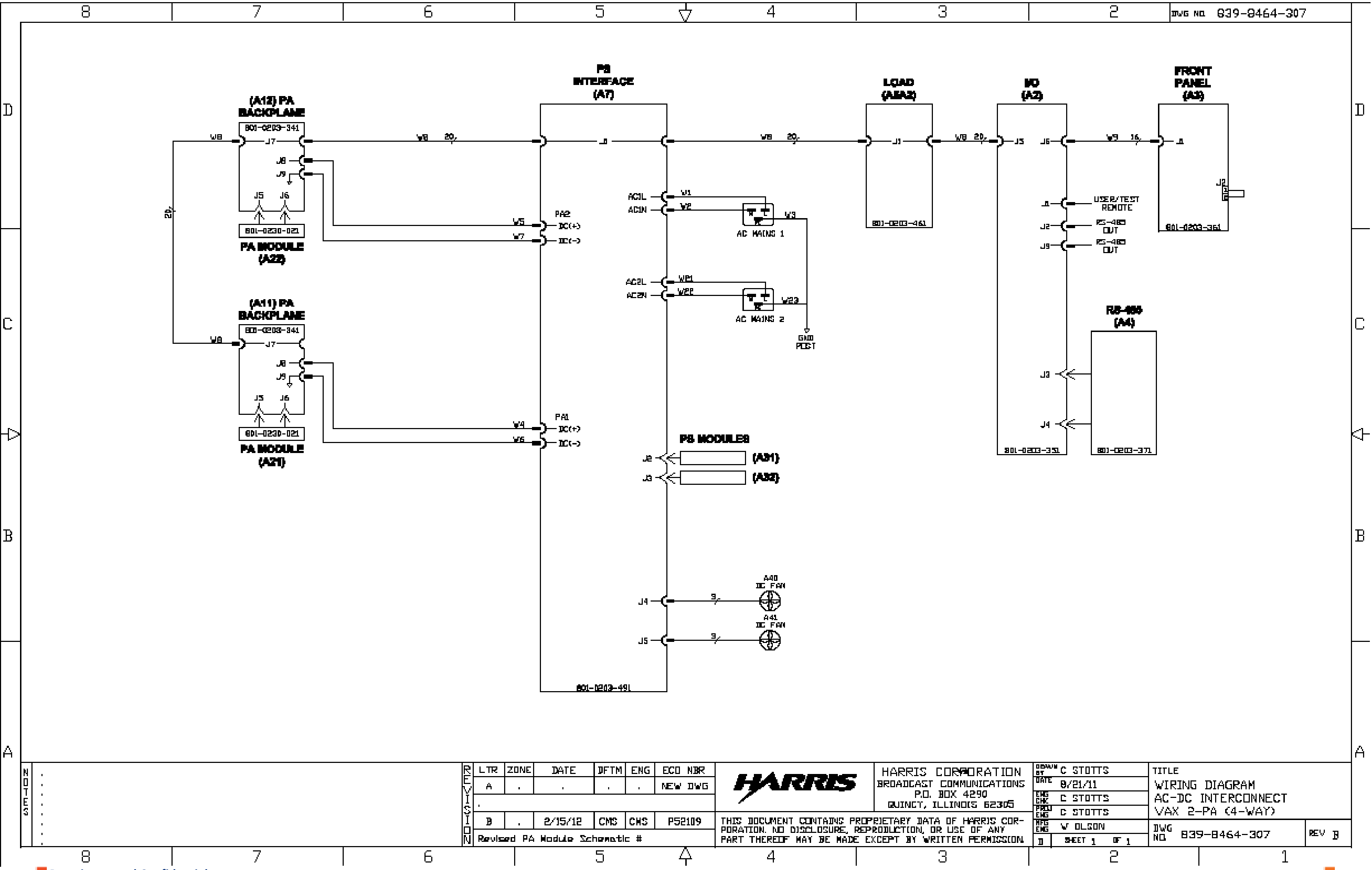
HARRIS CORPORATION
BROADCAST COMMUNICATIONS
4393 DIGITAL WAY
MASON, OHIO 45040

DRAWN: D SPARANO
DATE: 08/07/07
D SPARANO
D SPARANO
W OLSON

TITLE
SCH, BIII 2X PS INTERFACE

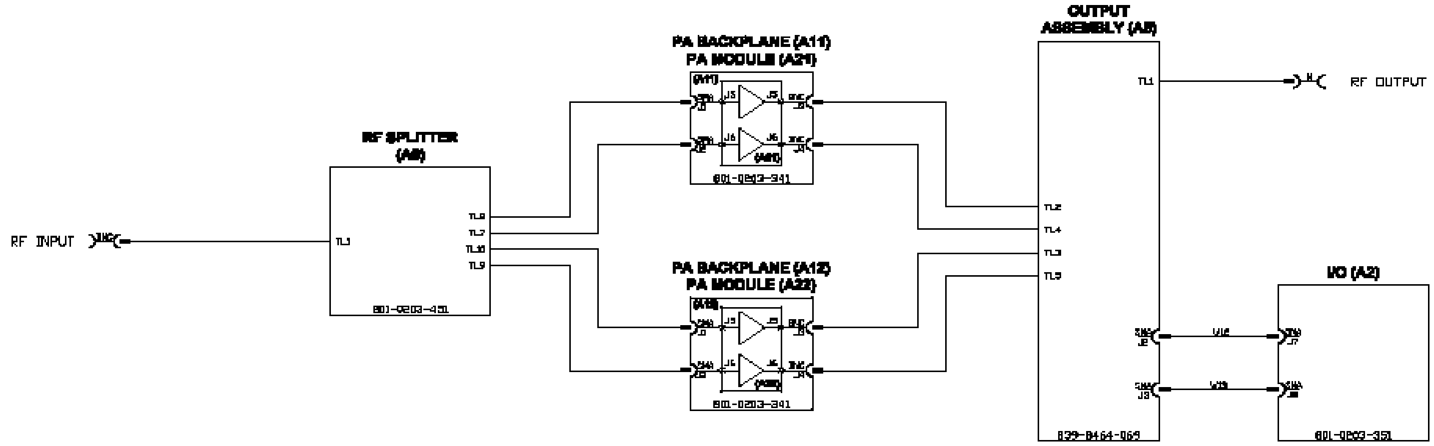
DWG # 801-0203-491 REV E
D SHEET 1 OF 2


PA/PS BUS
FAN 1
FAN 2
MODULE FAULT DISABLE
ON-PA 1,2 NOT FITTED
FAN FAULT DISABLE
OFF-FAN 1 NOT FITTED
OFF-FAN 2 NOT FITTED
LOAD TEMP SHUTDOWN
FAN SPEED ALARM
SHARED_PT
SHARED_50V
PA_VOLTS
INT_OFF_CMD
INT_ON_CMD
V_PROG
MODULE_FAULT
AC_FAULT
PA2_CURRENT
PA1_CURRENT
4. INDUCTANCE IN UH.
3. CAPACITANCE IN UF.
2. RESISTANCE IN OHMS.
1. ALL RESISTORS ARE 1/10 WATT, 5%.
UNLESS OTHERWISE NOTED:
SHEET NUMBER
ZONE
CONTINUATION SYMBOL
IMPROVE RFI IMMUNITY
HARRIS
HARRIS CORPORATION
BROADCAST COMMUNICATIONS
SCH. BIII 2X PS INTERFACE
801-0203-491



DWG NO. 839-8464-307
PS INTERFACE (A7)
LOAD (A5A2)
I/O (A2)
FRONT PANEL (A3)
(A12) PA BACKPLANE
801-0203-341
PA MODULE (A22)
801-0230-021
(A11) PA BACKPLANE
PA MODULE (A21)
PA2
DC(+)
DC(-)
PA1
AC1L
AC1N
AC2L
AC2N
AC MAINS 1
AC MAINS 2
GND POST
USER/TEST REMOTE
RS-485 OUT
RS-485 (A4)
PS MODULES
(A31)
(A32)
A40 DC FAN
A41 DC FAN
801-0203-491
801-0203-461
801-0203-361
801-0203-351
801-0203-371
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DRAWN BY C STOTTS
DATE 8/21/11
ENG CHK C STOTTS
PROJ ENG C STOTTS
MFG ENG W OLSON
TITLE
WIRING DIAGRAM
AC-DC INTERCONNECT
VAX 2-PA (4-WAY)
DWG NO 839-8464-307
REV B
SHEET 1 OF 1
LTR ZONE DATE DFTM ENG ECO NBR
A . . . . NEW DWG
B . 2/15/12 CMS CMS P52109
Revised PA Module Schematic #

DWG NO 839-8464-071



LTR	ZONE	DATE	DFTM	ENG	ECO NBR
F	C6	12/20/11	CS	CS	61084
CHANGED TL9 TO TL1					
E	.	7/13/10	CDB	DS	P47687
CHANGED RF SPLITTER DESIGNATOR					

HARRIS

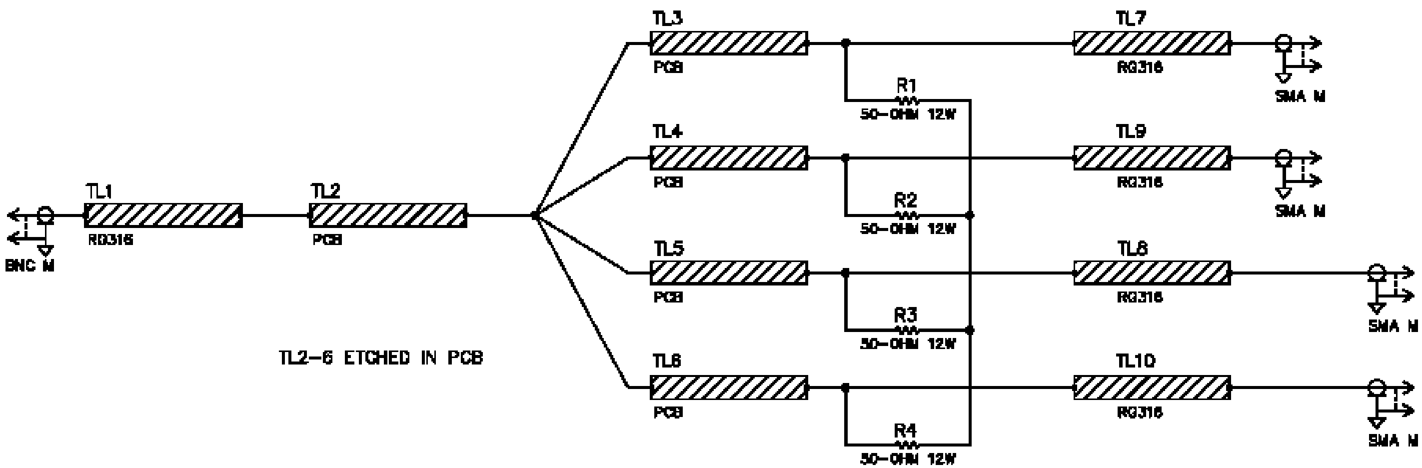
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QUINCY, ILLINOIS 62305

DRAWN BY D SPARAND
DATE 07/12/07
ENG CHK D SPARAND
PROJ ENG D SPARAND
MFG ENG W OLSON
D SHEET 1 OF 1

TITLE
WIRING DIAGRAM
RF INTERCONNECT
V 670-500/VAX-2PA (4-WAY)

DWG NO 839-8464-071 REV F

DWG NO. 801-0203-451



TL2-6 ETCHED IN PCB

NOTES

REVISION

LTR	ZONE	DATE	DFTM	ENG	ECO NBR
A	.	08/16/07	DS	DS	P37174
NEW DWG					
A1	.	4/28/10	BG	BG	58852
REMOVED J1 – J5					

HARRIS

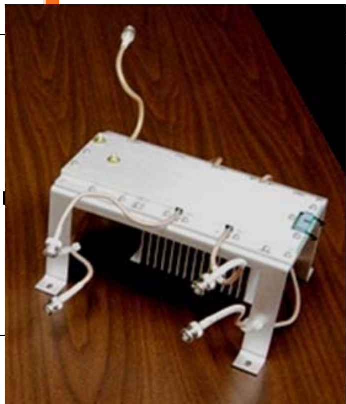
HARRIS CORPORATION
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P.O. BOX 4290
QUINCY, ILLINOIS 62305

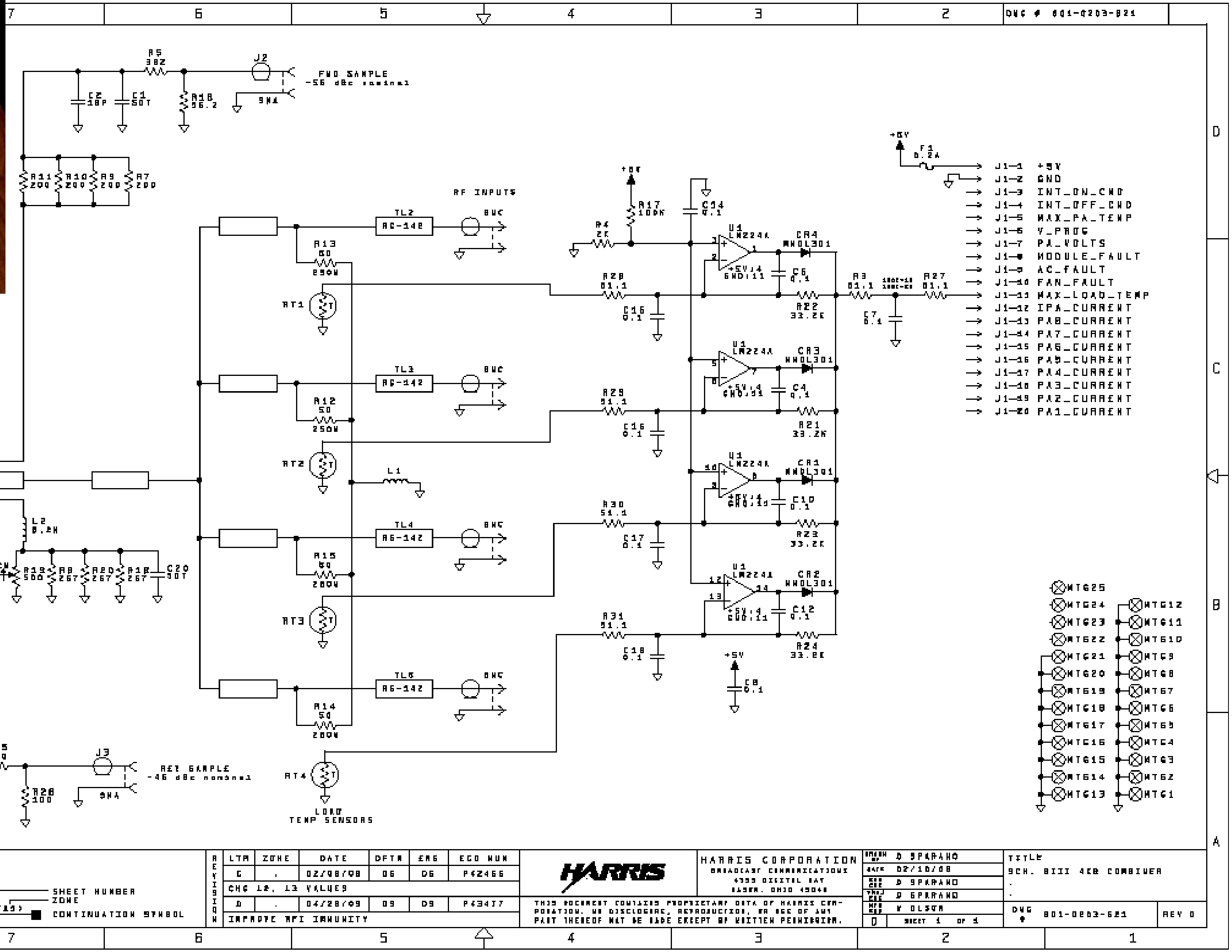
D SPARANO
08/15/07
D SPARANO
D SPARANO
W OLSON
D SHEET 1 OF 1

TITLE SCH, BIII 4X SPLITTER

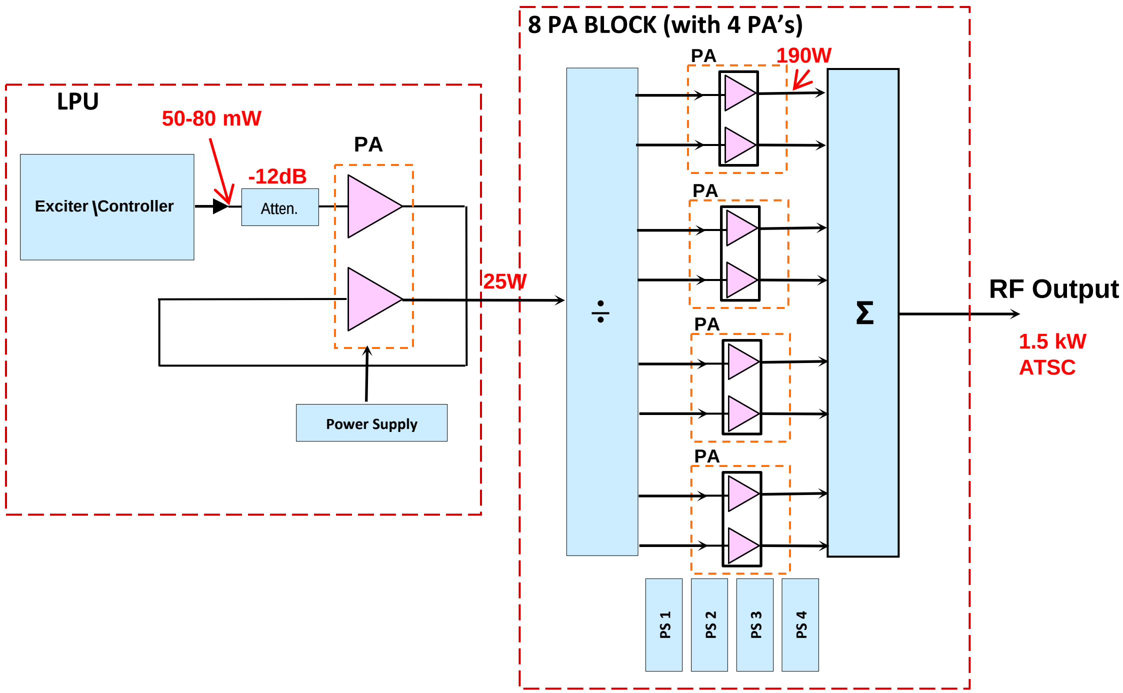
DWG NO. 801-0203-451 REV A1

SCH, BIII 4X COMBINER 801-0203-621 SECTION 400

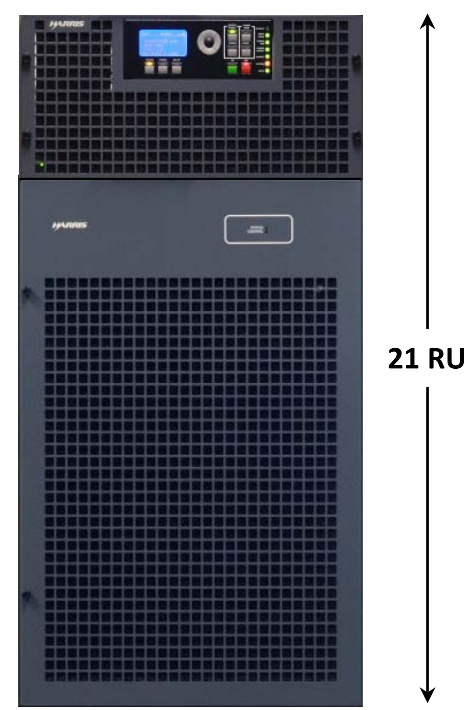




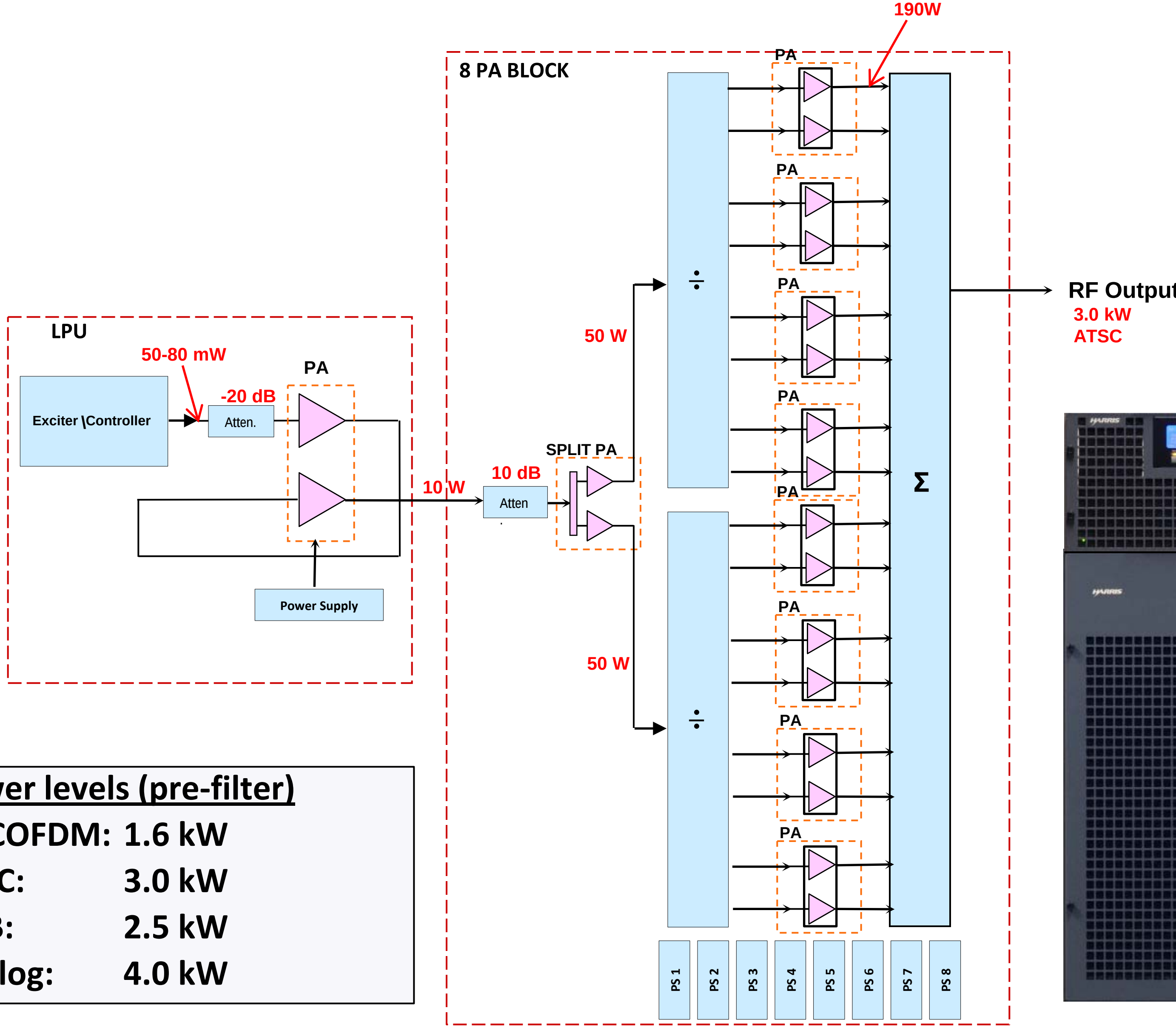
BLOCK DIAGRAM VAX 4 PA SYSTEM

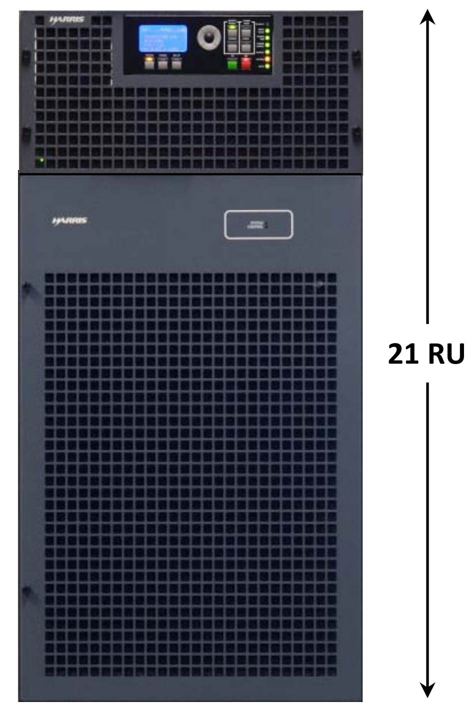


Power levels (pre-filter)	
TV COFDM:	**800 W**
DAB:	**1.25 kW**
ATSC:	**1.5 kW**
Analog:	**2.0 kW**



BLOCK DIAGRAM VAX 8 PA SYSTEM

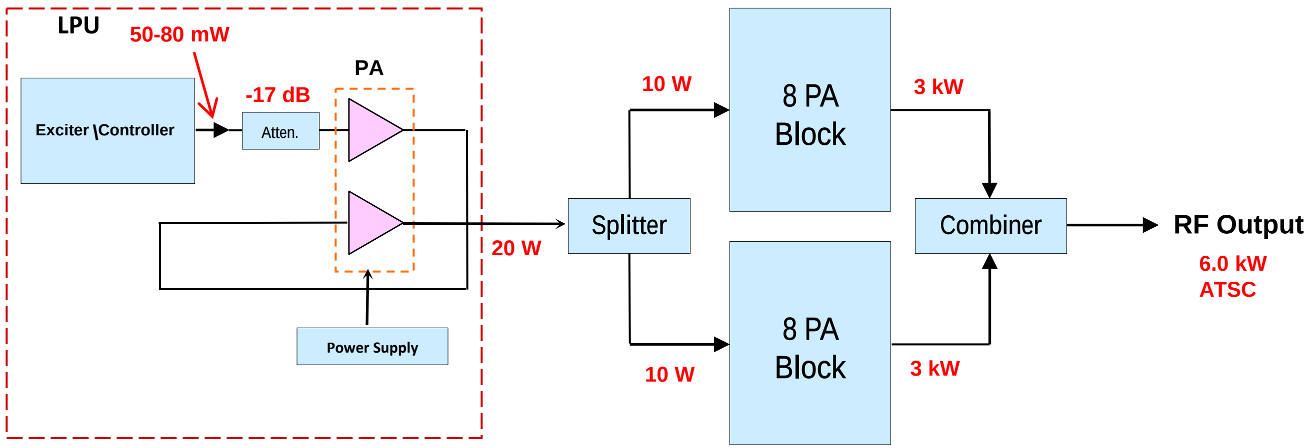




Power levels (pre-filter)

TV COFDM:	1.6 kW
ATSC:	3.0 kW
DAB:	2.5 kW
Analog:	4.0 kW

BLOCK DIAGRAM VAX 16 PA SYSTEM WITH 1 LPU

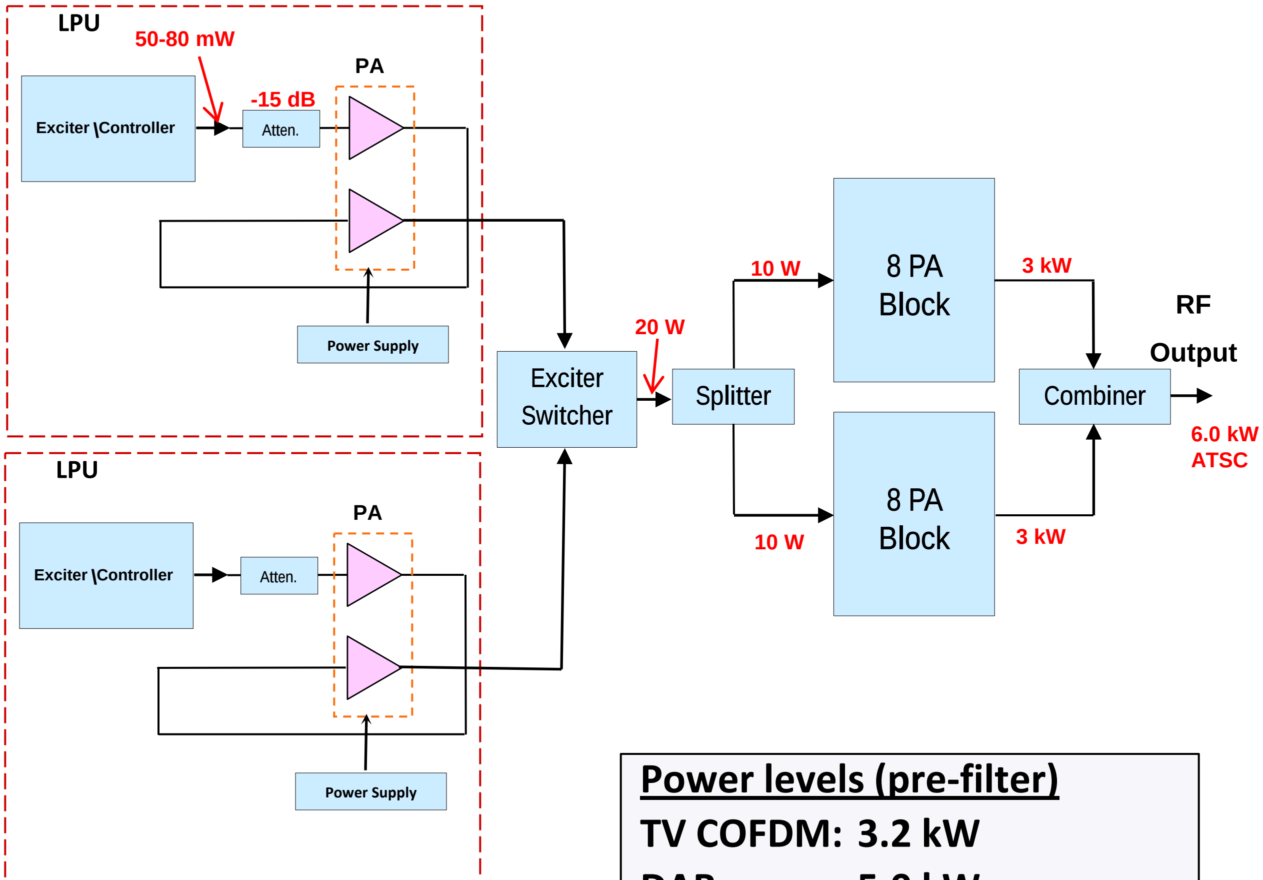


Power levels (pre-filter)	
TV COFDM:	**3.2 kW**
DAB:	**5.0 kW**
ATSC:	**6.0 kW**
Analog:	**8.0 kW**



44 RU Deluxe Rack

BLOCK DIAGRAM VAX 16 PA SYSTEM WITH 2 LPU'S



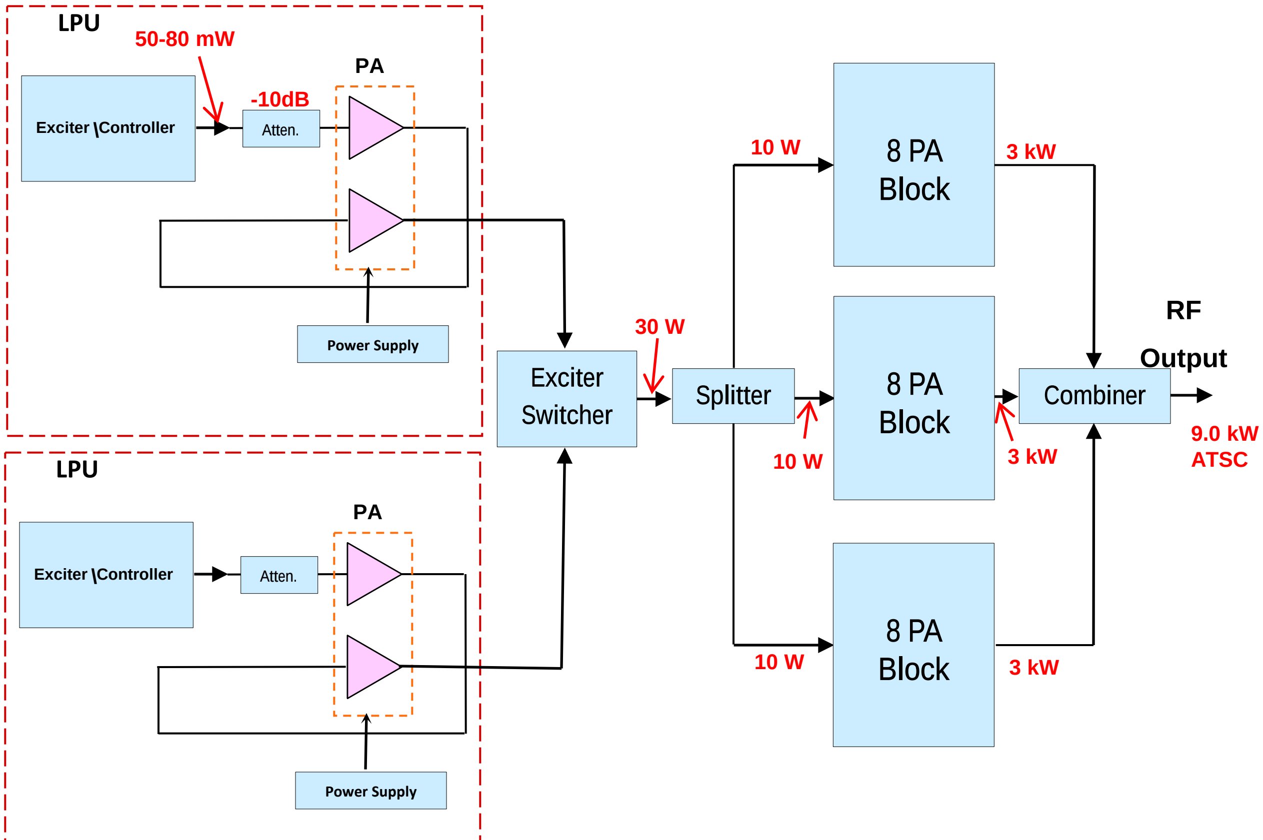
<u>Power levels (pre-filter)</u>

TV COFDM:	**3.2 kW**
DAB:	**5.0 kW**
ATSC:	**6.0 kW**
Analog:	**8.0 kW**



2 x 44 RU Deluxe Rack

BLOCK DIAGRAM VAX 24 PA SYSTEM WITH 2 LPU'S



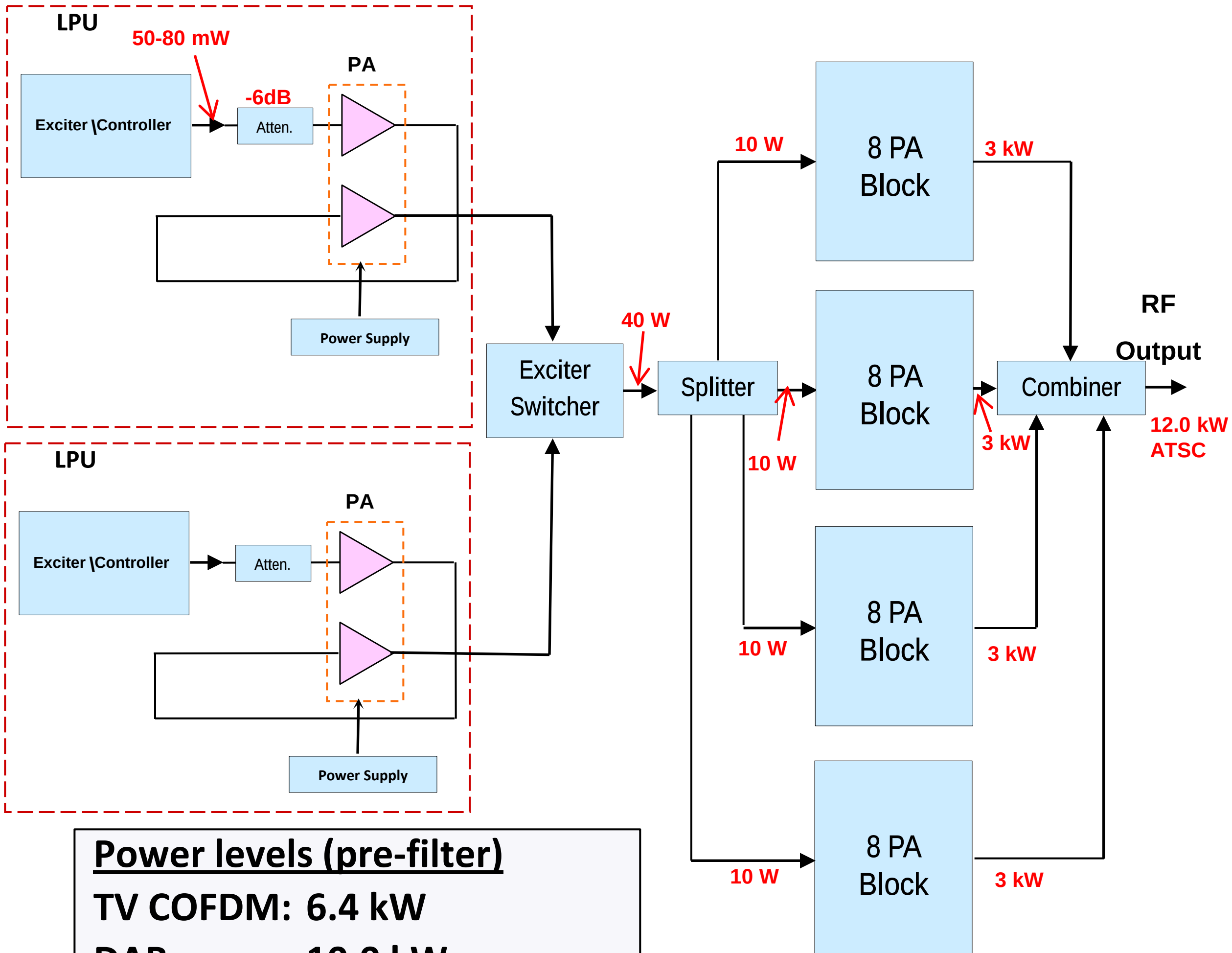
Power levels (pre-filter)

TV COFDM:	4.8 kW
DAB:	7.5 kW
ATSC:	9.0 kW
Analog:	12.0 kW



2 x 44 RU Deluxe Rack

BLOCK DIAGRAM VAX 32 PA SYSTEM WITH 2 LPU'S



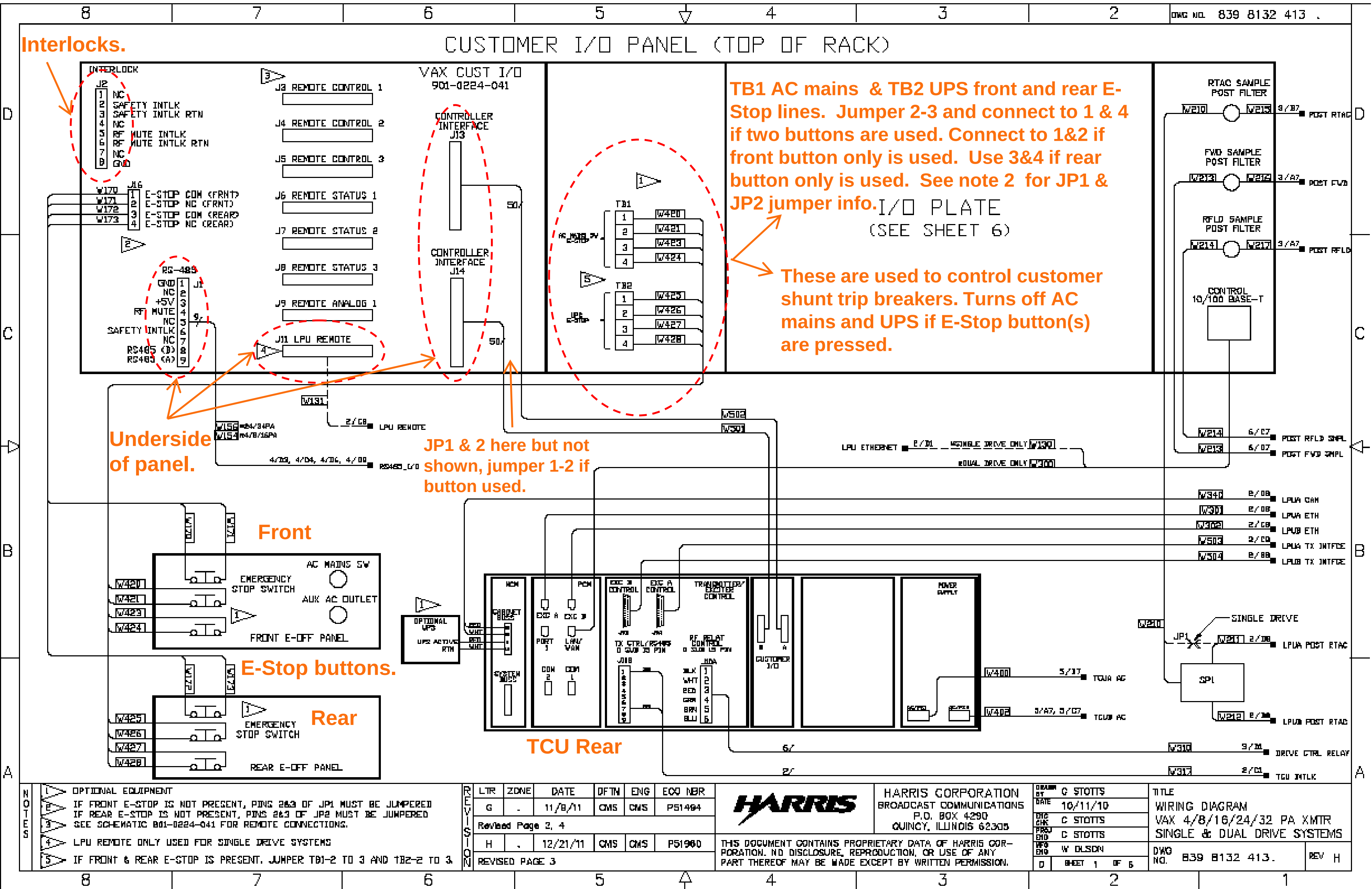
Power levels (pre-filter)

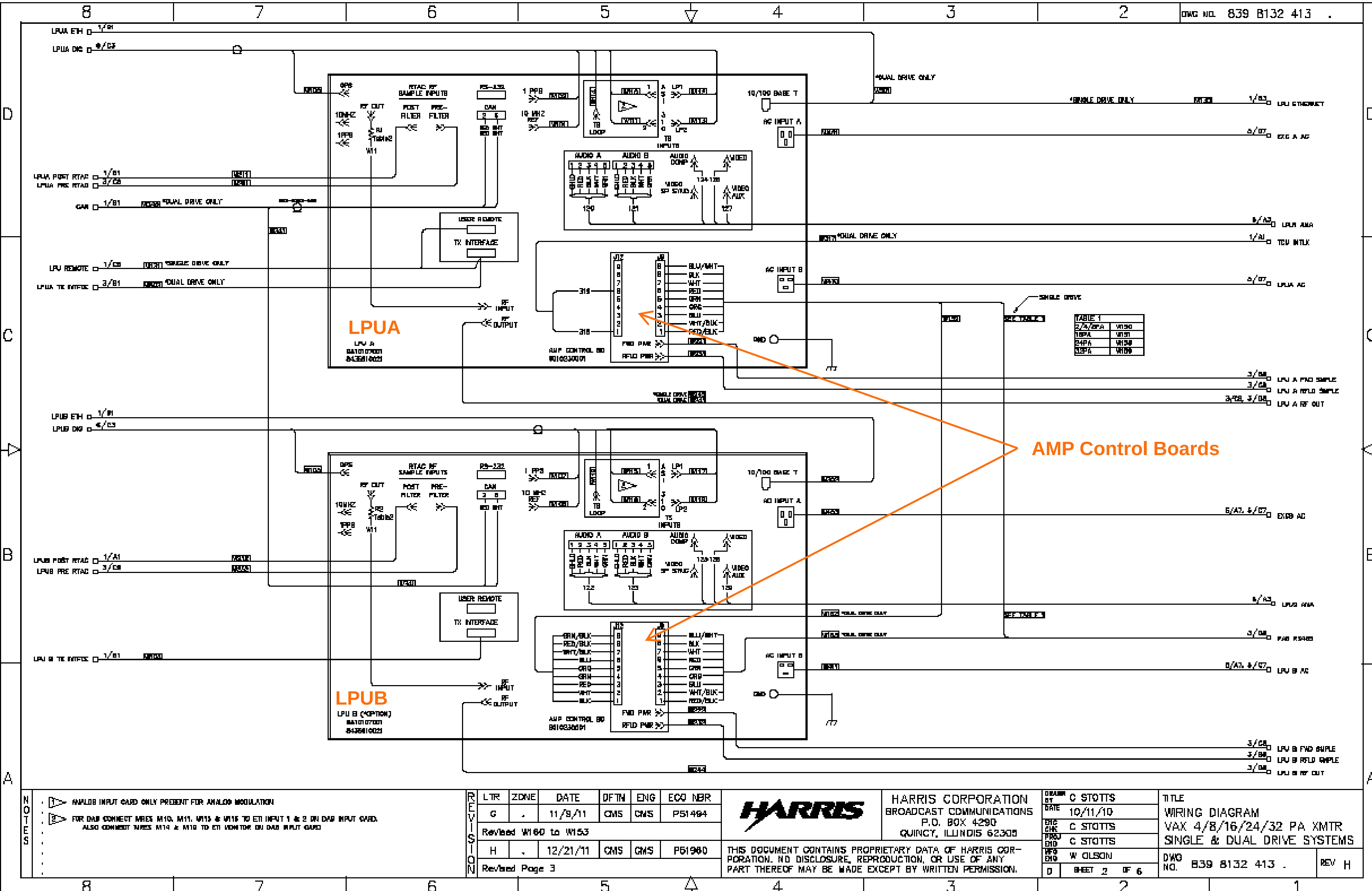
TV COFDM:	6.4 kW
DAB:	10.0 kW
ATSC:	12.0 kW
Analog:	16.0 kW



2 x 44 RU Deluxe Rack

WIRING DIAGRAM, VAX 4/8/16/24/32PA 839-8132-413 SECTION 100




LPUA
LPUB
AMP Control Boards
LPUA ETH
LPUA DIG
LPUA POST RTAC
LPUA PRE RTAC
CAN
LPU REMOTE
LPUA TX INTFCE
LPUB ETH
LPUB DIG
LPUB POST RTAC
LPUB PRE RTAC
LPU B TX INTFCE
GPS
10MHZ
1PPS
RF OUT
RTAC RF SAMPLE INPUTS
POST FILTER
PRE-FILTER
RS-232
CAN
1 PPS
10 MHZ REF
TB LOOP
LP1
LP2
TB INPUTS
10/100 BASE T
AC INPUT A
AC INPUT B
AUDIO A
AUDIO B
AUDIO COMP
VIDEO
VIDEO SP STND
VIDEO AUX
USER REMOTE
TX INTERFACE
RF INPUT
RF OUTPUT
FWD PWR
RFLD PWR
AMP CONTROL BD
GND
*DUAL DRIVE ONLY
*SINGLE DRIVE ONLY
LPU ETHERNET
EXC A AC
LPU ANA
TCU INTLK
LPUA AC
SINGLE DRIVE
SEE TABLE 1
TABLE 1
2/4/8PA
16PA
24PA
32PA
LPU A FWD SMPLE
LPU A RFLD SMPLE
LPU A RF OUT
EXCB AC
LPU ANA
FWD RS485
LPU B AC
LPU B FWD SMPLE
LPU B RFLD SMPLE
LPU B RF OUT
BLU/WHT
BLK
WHT
RED
GRN
ORG
BLU
WHT/BLK
RED/BLK
GRN/BLK
NOTES
ANALOG INPUT CARD ONLY PRESENT FOR ANALOG MODULATION
FOR DAB CONNECT WIRES W10, W11, W15 & W16 TO ETI INPUT 1 & 2 ON DAB INPUT CARD. ALSO CONNECT WIRES W14 & W13 TO ETI MONITOR ON DAB INPUT CARD
REVISION
LTR
ZONE
DATE
DFTN
ENG
ECO NBR
G
11/9/11
CMS
CMS
P51494
Revised W160 to W153
H
12/21/11
CMS
CMS
P51960
Revised Page 3
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C STOTTS
10/11/10
C STOTTS
C STOTTS
W OLSON
TITLE
WIRING DIAGRAM
VAX 4/8/16/24/32 PA XMTR
SINGLE & DUAL DRIVE SYSTEMS
DWG NO. 839 8132 413
REV H
SHEET 2 OF 6

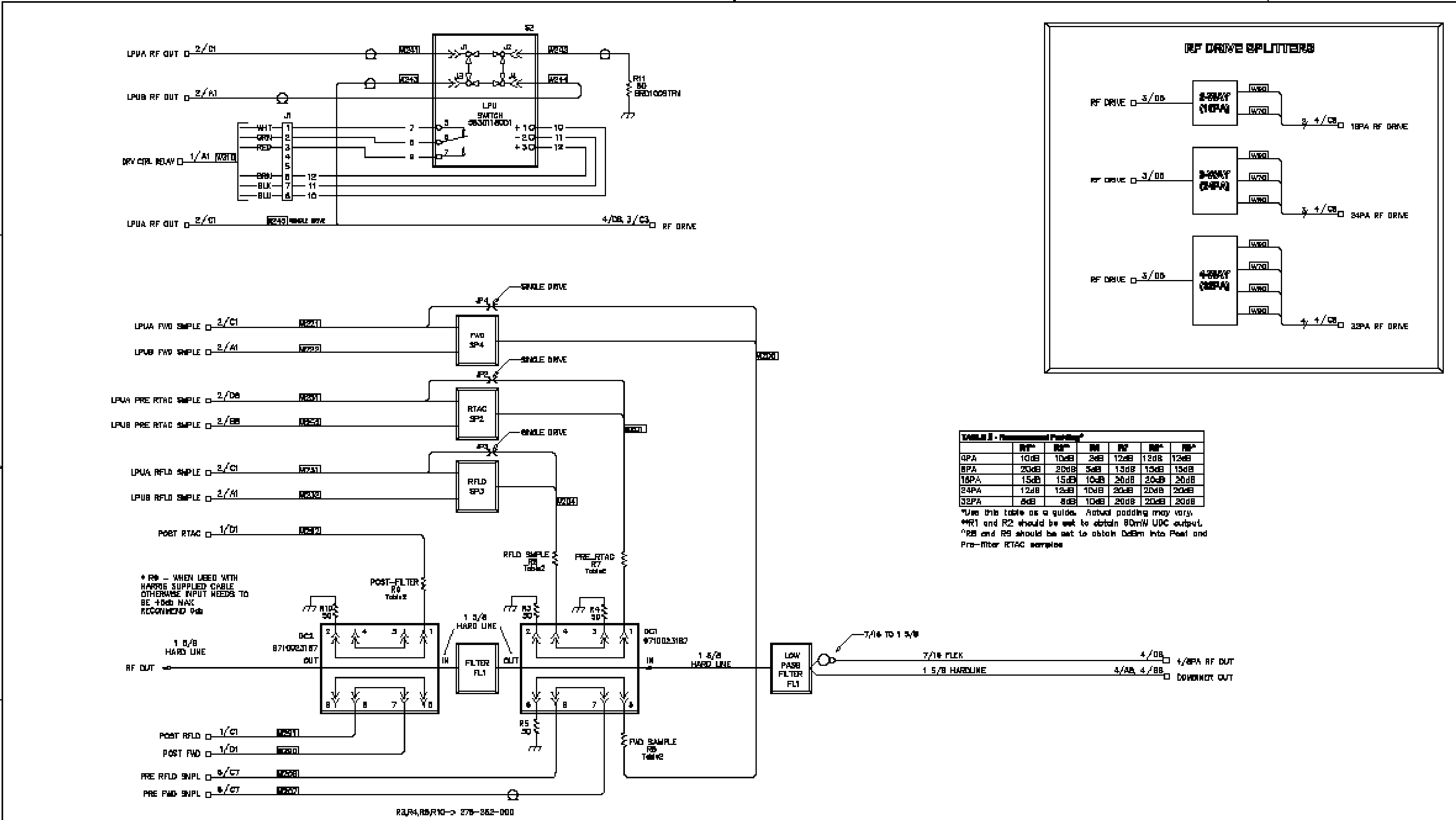


TABLE [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
4PA	10dB	10dB	2dB	12dB	12dB	12dB
8PA	20dB	20dB	5dB	15dB	15dB	15dB
16PA	15dB	15dB	10dB	20dB	20dB	20dB
24PA	12dB	12dB	10dB	20dB	20dB	20dB
32PA	8dB	8dB	10dB	20dB	20dB	20dB

*Use this table as a guide. Actual padding may vary.
**R1 and R2 should be set to obtain 80mW UDC output.
^R8 and R9 should be set to obtain 0dBm into Post and Pre-filter RTAC samples

LTR	ZONE	DATE	DFTN	ENG	ECO NBR
G	.	11/8/11	CMS	CMS	P51494
Revised Page 2/4					
H	.	12/20/11	CMS	CMS	P51980
Revised Attenuator Table					

HARRIS

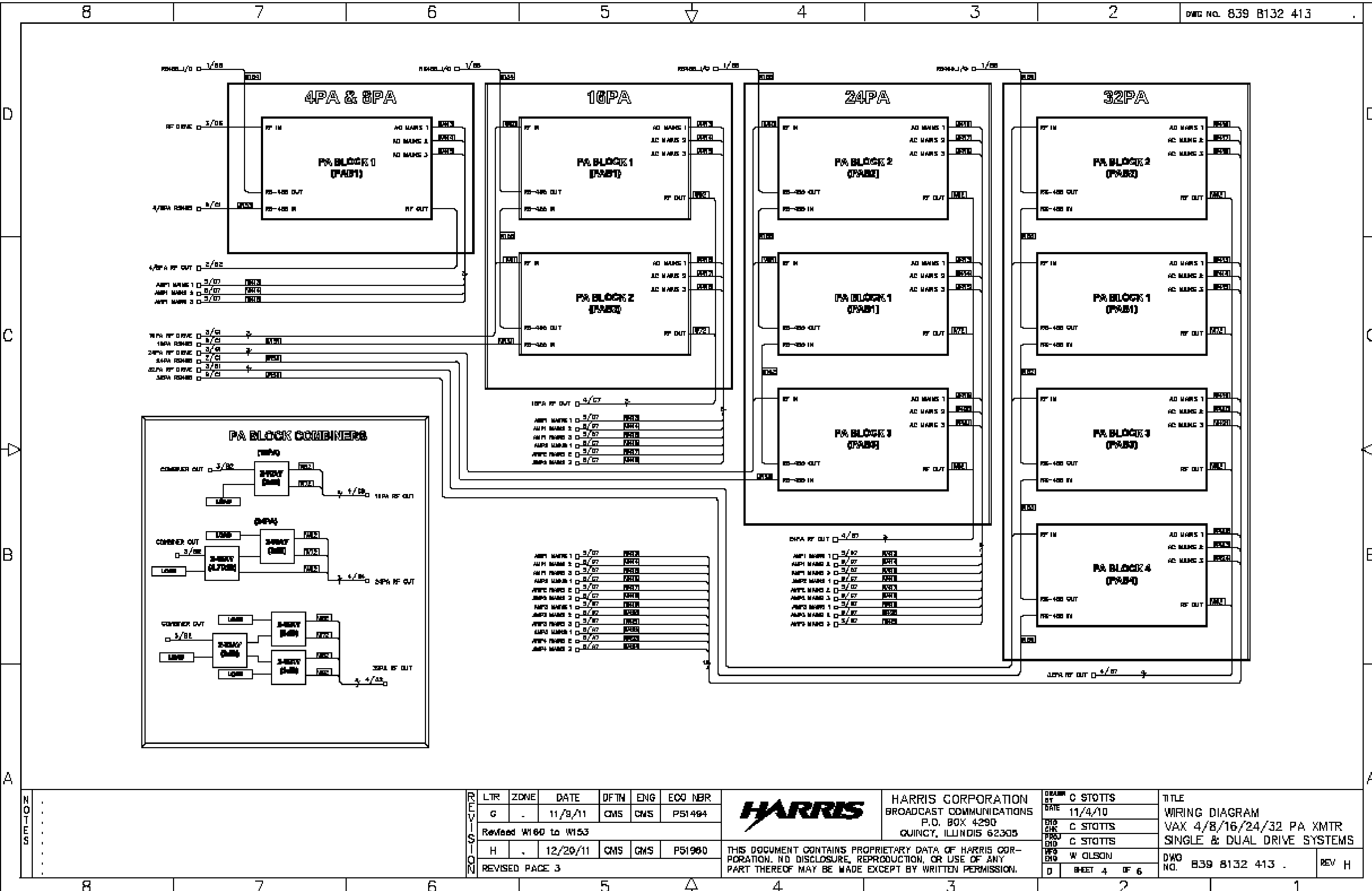
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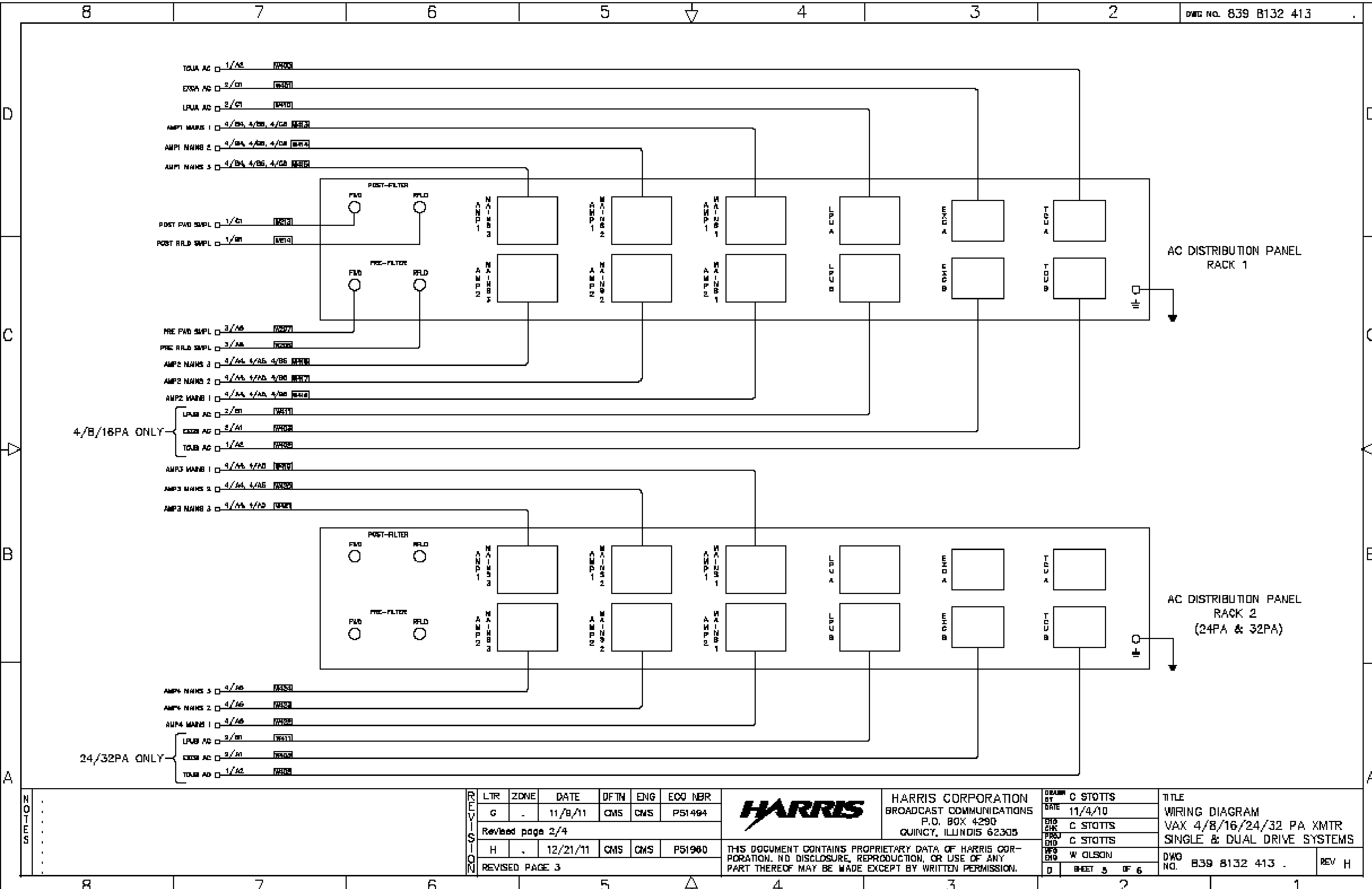
DRAWN BY: C STOTTS
DATE: 11/4/10
ENG CHK: C STOTTS
PROJ ENG: C STOTTS
MFG ENG: W OLSON

TITLE: WIRING DIAGRAM VAX 4/8/16/24/32 PA XMTR SINGLE & DUAL DRIVE SYSTEMS

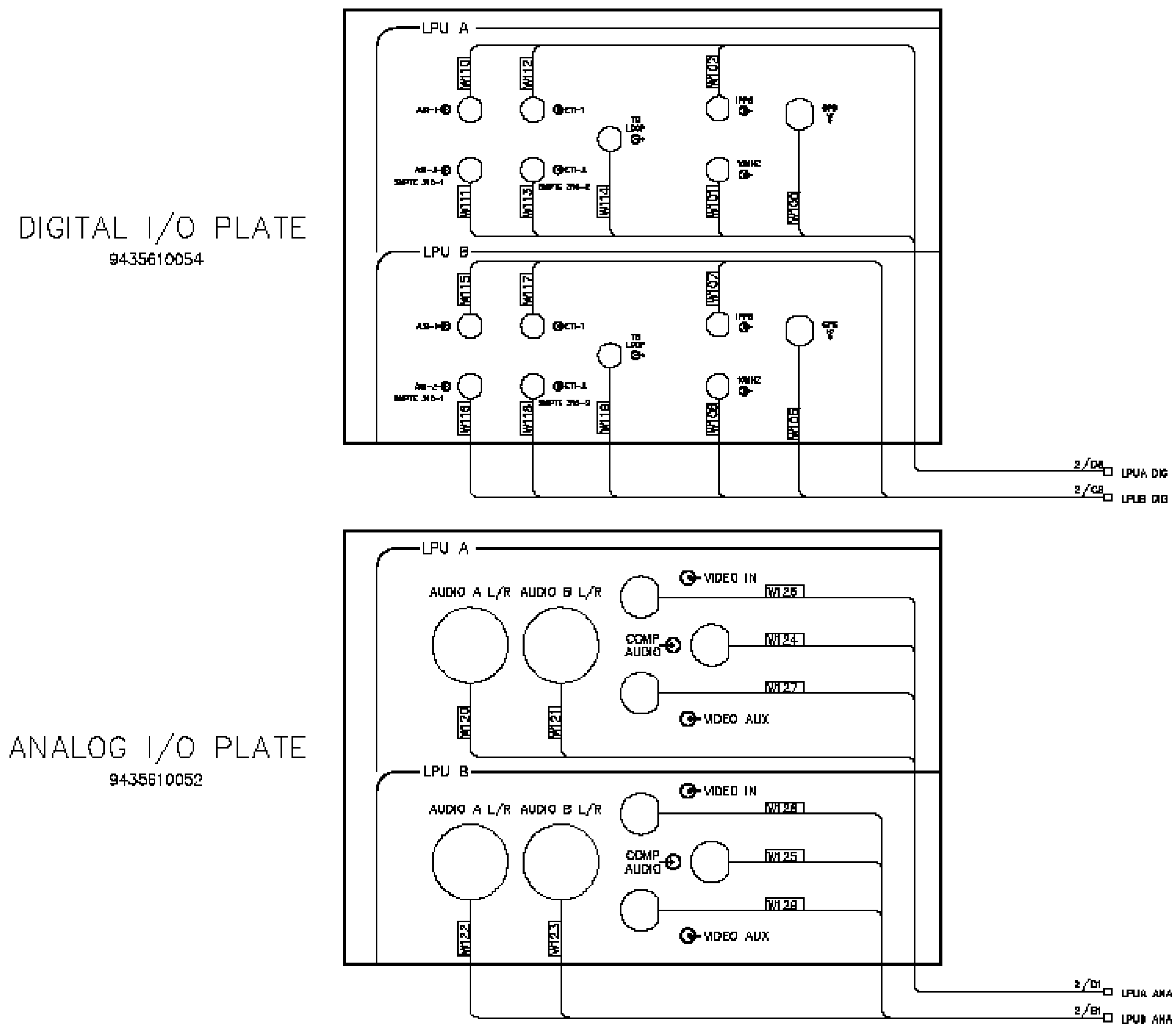
DWG NO. 839 8132 413 . REV H

D SHEET 3 OF 6


4PA & 8PA
PA BLOCK 1 (PAB1)
16PA
PA BLOCK 1 (PAB1)
PA BLOCK 2 (PAB2)
24PA
PA BLOCK 2 (PAB2)
PA BLOCK 1 (PAB1)
PA BLOCK 3 (PAB3)
32PA
PA BLOCK 2 (PAB2)
PA BLOCK 1 (PAB1)
PA BLOCK 3 (PAB3)
PA BLOCK 4 (PAB4)
PA BLOCK COMBINERS
DWG NO. 839 8132 413
LTR
ZONE
DATE
DFTN
ENG
ECO NBR
G
11/9/11
CMS
CMS
P51494
Revised W160 to W153
H
12/20/11
CMS
CMS
P51960
REVISED PAGE 3
REVISION
NOTES
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DATE 11/4/10
ENG CHK C STOTTS
PROJ ENG C STOTTS
MFG ENG W OLSON
TITLE
WIRING DIAGRAM
VAX 4/8/16/24/32 PA XMTR
SINGLE & DUAL DRIVE SYSTEMS
DWG NO. 839 8132 413
REV H
D
SHEET 4 OF 6


AC DISTRIBUTION PANEL
RACK 1
AC DISTRIBUTION PANEL
RACK 2
(24PA & 32PA)
4/8/16PA ONLY
24/32PA ONLY
POST-FILTER
PRE-FILTER
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WIRING DIAGRAM
VAX 4/8/16/24/32 PA XMTR
SINGLE & DUAL DRIVE SYSTEMS
DWG NO. 839 8132 413
REV H
Revised page 2/4
REVISED PAGE 3

DWG NO. 839 8132 413 .



LTR	ZONE	DATE	DFTN	ENG	ECO NBR
G	.	11/8/11	CMS	CMS	P51484
Revised Page 2/4					
H	.	12/21/11	CMS	CMS	P51960
REVISED PAGE 3					

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DRAWN BY	C STOTTS
DATE	11/4/10
ENG CHK	C STOTTS
PROJ ENG	C STOTTS
MFG ENG	W OLSON
D	SHEET 6 OF 6

TITLE
WIRING DIAGRAM
VAX 4/8/16/24/32 PA XMTR
SINGLE & DUAL DRIVE SYSTEMS

DWG NO. 839 8132 413 . REV H

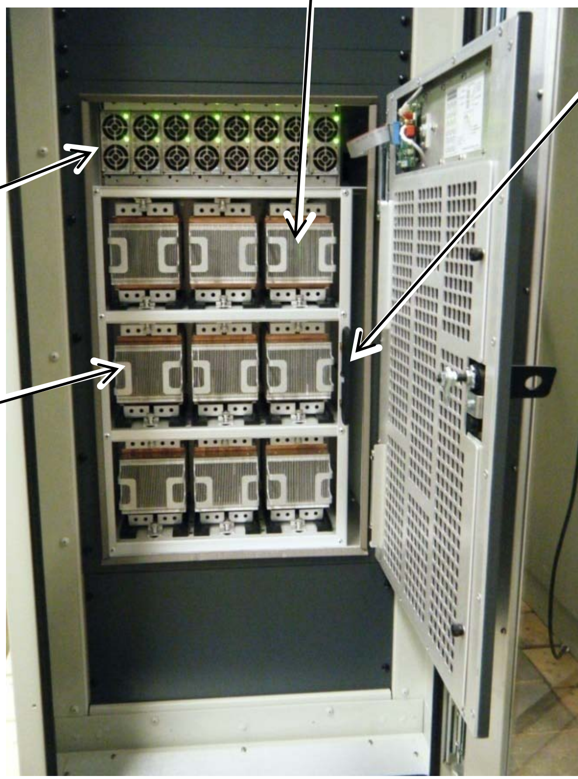
4/8 PA PAB (Power Amplifier Block)

IPA

5/16” (8mm) Hex wrench for rear door.

PS

PA



PAB Front

Control Board

Washable Filter (ships with extra)

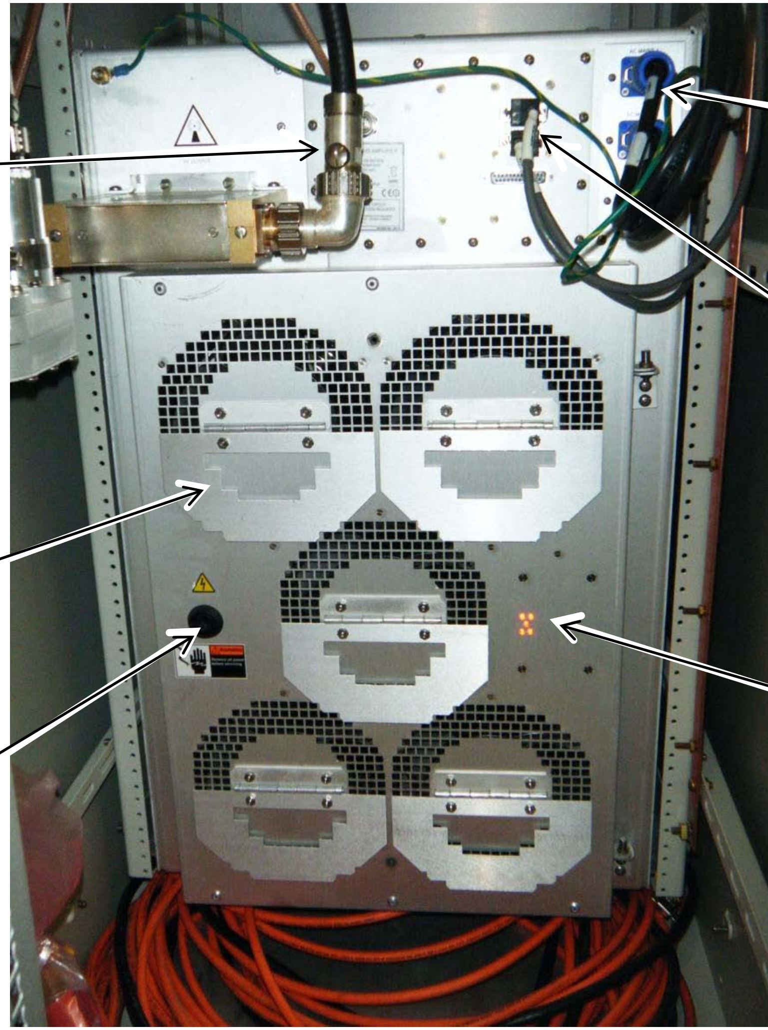


PAB Front Door

4/8 PA PAB (Power Amplifier Block)

RF Out

AC Mains



Flappers prevents fan stalls at start-up. Obsolete soon.

5/16 (8 mm) hex wrench opens door.

RS 485

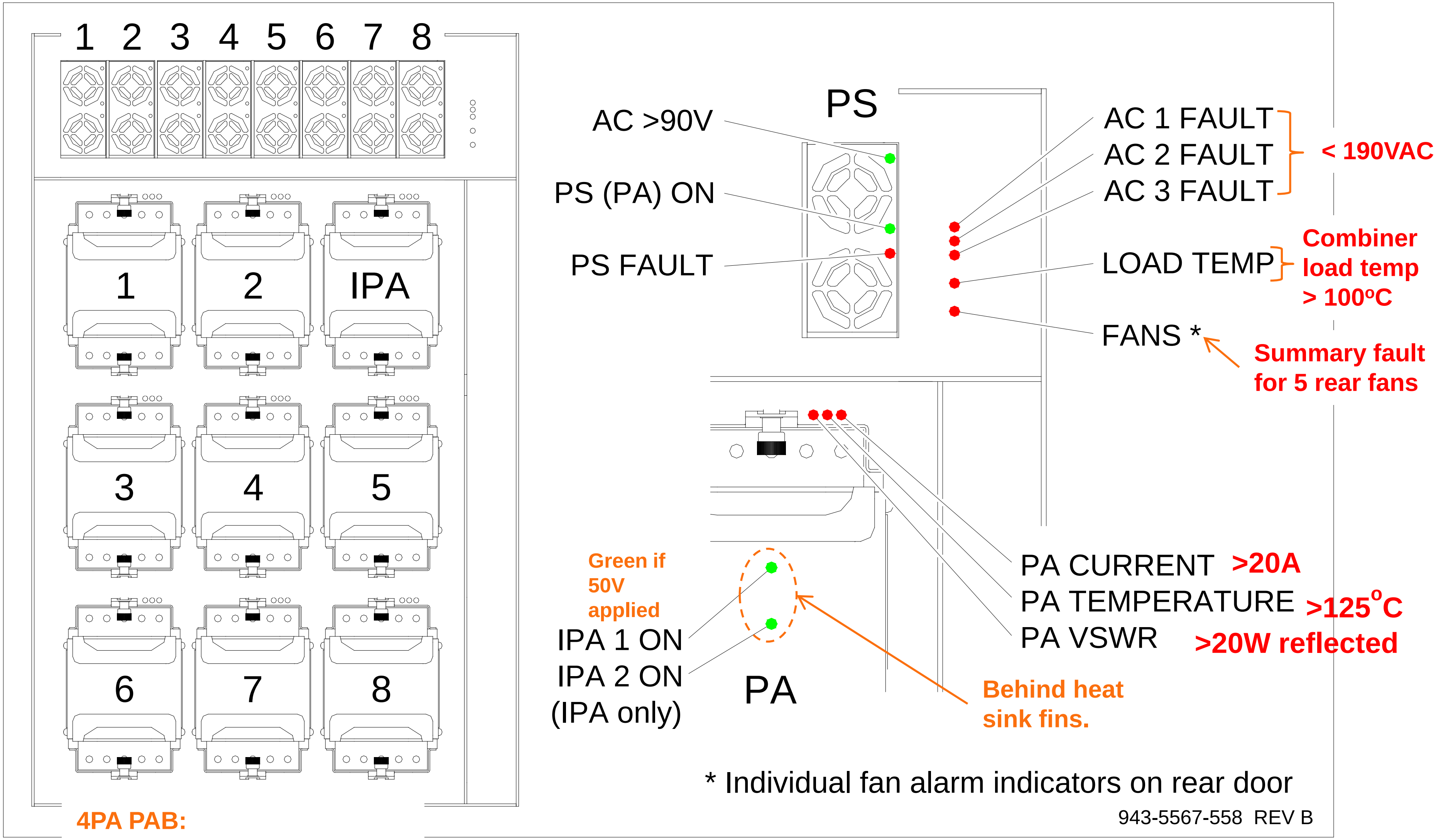
Rear door not interlocked.

5 fan LEDs feed summary fan fault on front.

Remove back door to change all fans quickly.

PAB Rear

PS & MODULE – LED'S



4PA PAB:
PS 1,3,5, & 7 removed
IP & PA 1,3,5, 7 removed

PS & MODULE – LED'S

Table 6-1 4/8 PA PAB PS & PA LEDs

LED	Location	Indication	Conditions
Status	Front door of PAB	Green/Orange/ Red	Green = on, no faults Orange = on, with faults Red = Off
Control		Red/Off	Red = too many restarts
AC>90V	Front of PSs	Green/Off	Green = AC to PS is above 90VAC.
PS (PA) ON		Green/Off	PS is on and producing 50 VDC.
Fault		Red/Off	Normally not lit. Red when internal PS overcurrent or overtemperature condition exists.
AC 1 Fault	PAB backplane right of PSs.	Red/Off	AC mains are lower than 190VAC
AC 2 Fault		Red/Off	AC mains are lower than 190VAC
AC 3 Fault		Red/Off	AC mains are lower than 190VAC
Fans		Red/Off	Summary fault indicating that one or more of five PAB fans have failed.
Load Temp		Red/Off	Summary fault indicating that 1 or more combiner loads have exceeded 100° C. limit.
PA Current	PAB backplane behind upper right corner of PA.	Red/Off	PA current has exceeded 20A.
PA Temperature		Red/Off	PA temperature has exceeded 125° C limit.
PA VSWR		Red/Off	PA reflected power has exceeded approximately 20W
Fan LEDs (5)	PAB back door.	Red/Off	Fan RPM has dropped to below 2/3 of nominal value.

Will shut down PAB.

Warning given at 115° C.

125° C. corresponds to 150° C. FET junction temp.

Remote Enable/Disable

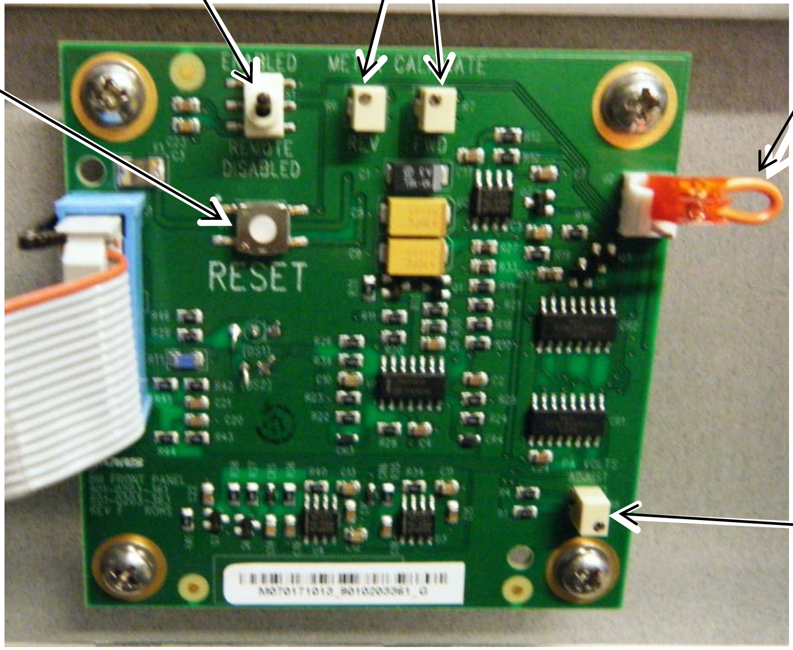
Disable forces PAB on.

PAB Cal Pots

Resets Internal Faults

Pressing this reset will turn on all modules in PAB without turning off active modules.

ON button for transmitter will reset all modules in transmitter by first turning them off. This takes transmitter off-air for a few seconds.



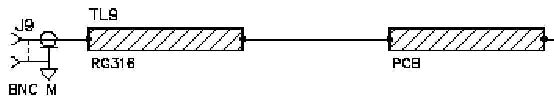
Remove Jumper to Keep PAB OFF

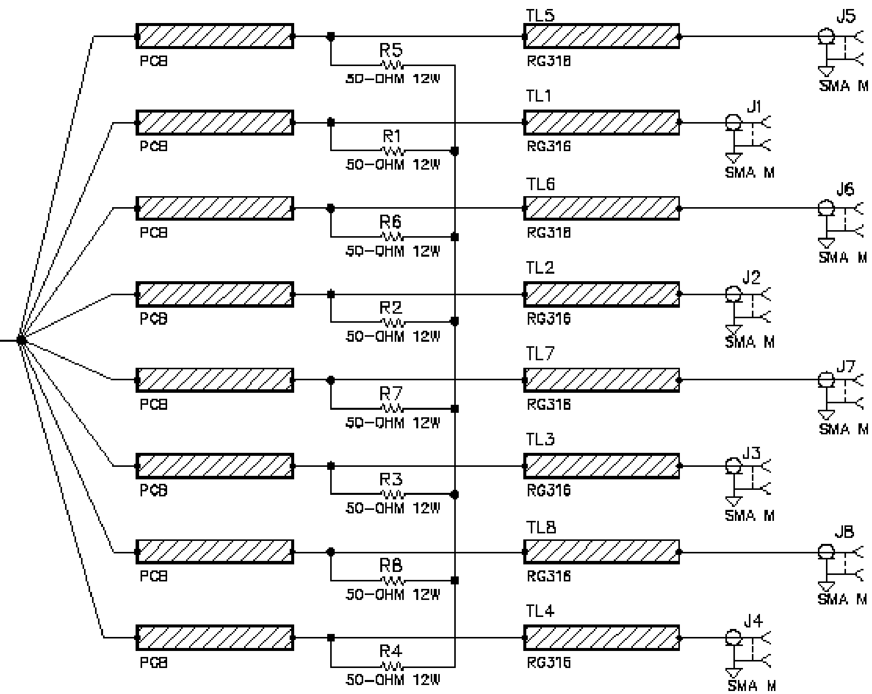
(was a switch in DMB)

PS Voltage Adjust (set to 50V at factory). Lower voltage means lower output power.

8 7 6 5 4 3 2 DWG NO. 801-0203-301







NOTES

REVISION

LTR	ZONE	DATE	DFTM	ENG	ECO NBR
A	.	01/29/08	DS	DS	NEWDWG
.	.	.	.	.	.

HARRIS

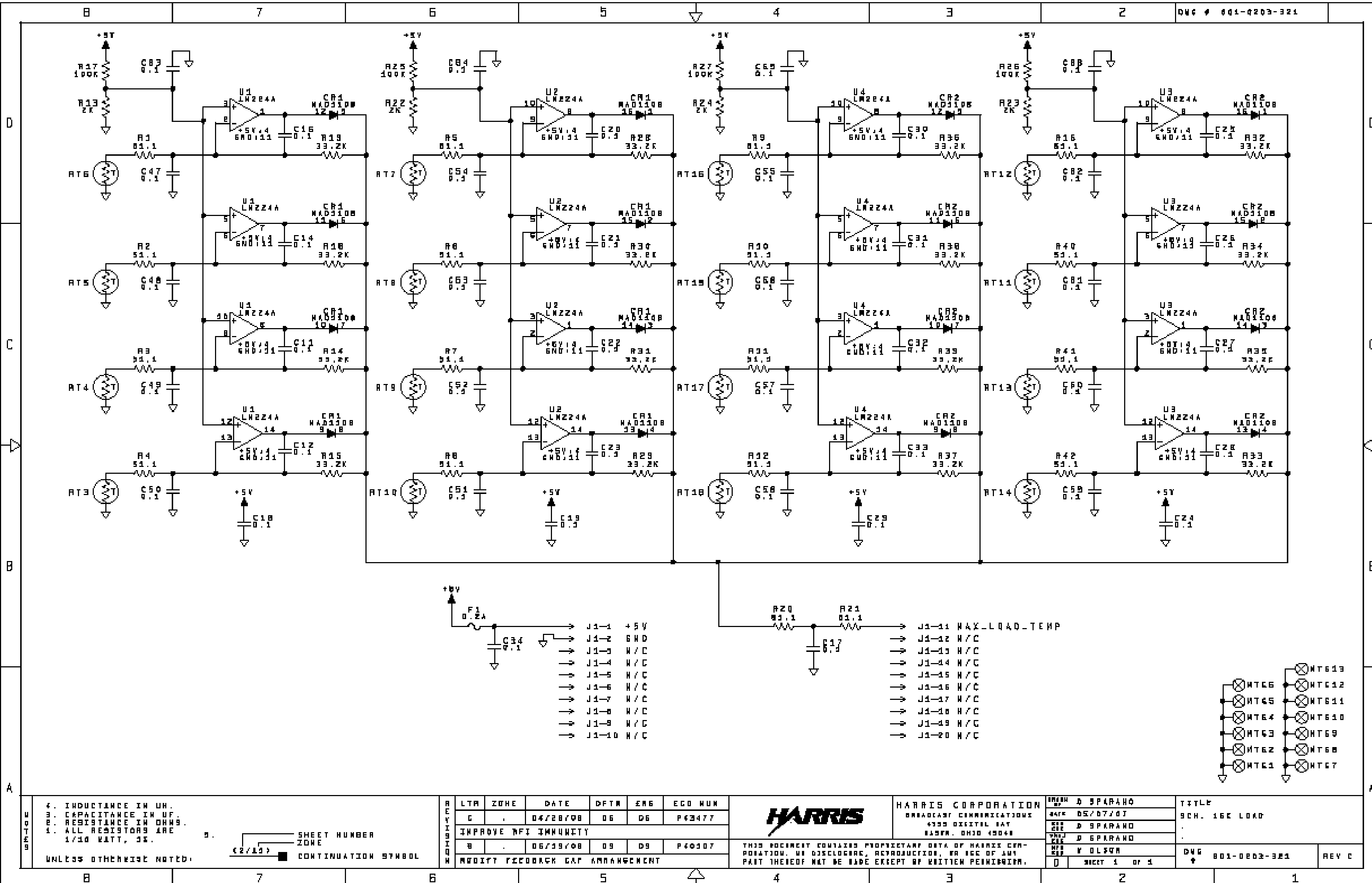
HARRIS CORPORATION
BROADCAST SYSTEMS
P.O. BOX 4290
QUINCY, ILLINOIS 62305

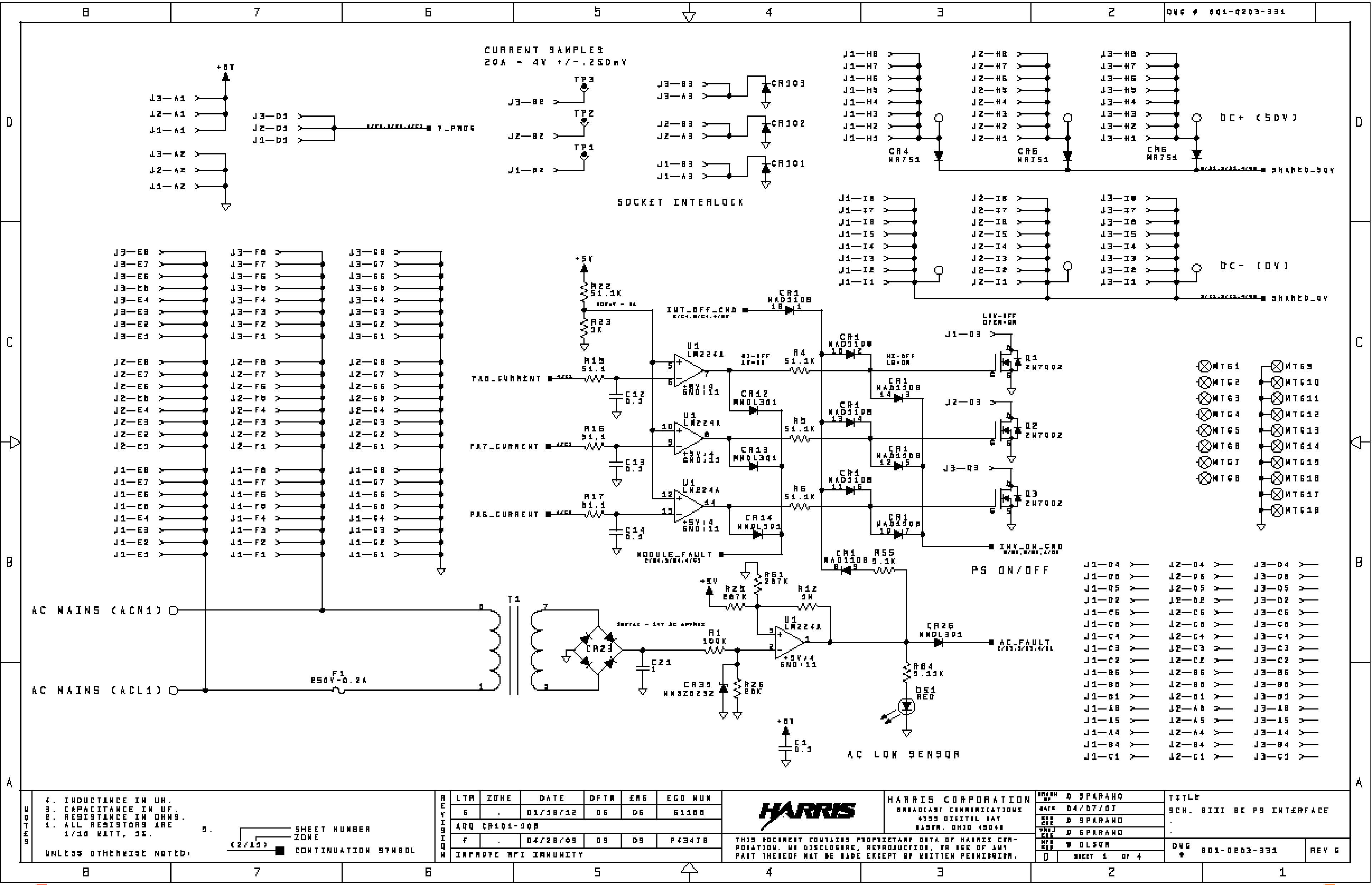
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DATE 01/29/08
DSG CHK D SPARANO
PROJ ENG D SPARANO
MFG ENG W OLSON
D SHEET 1 OF 1

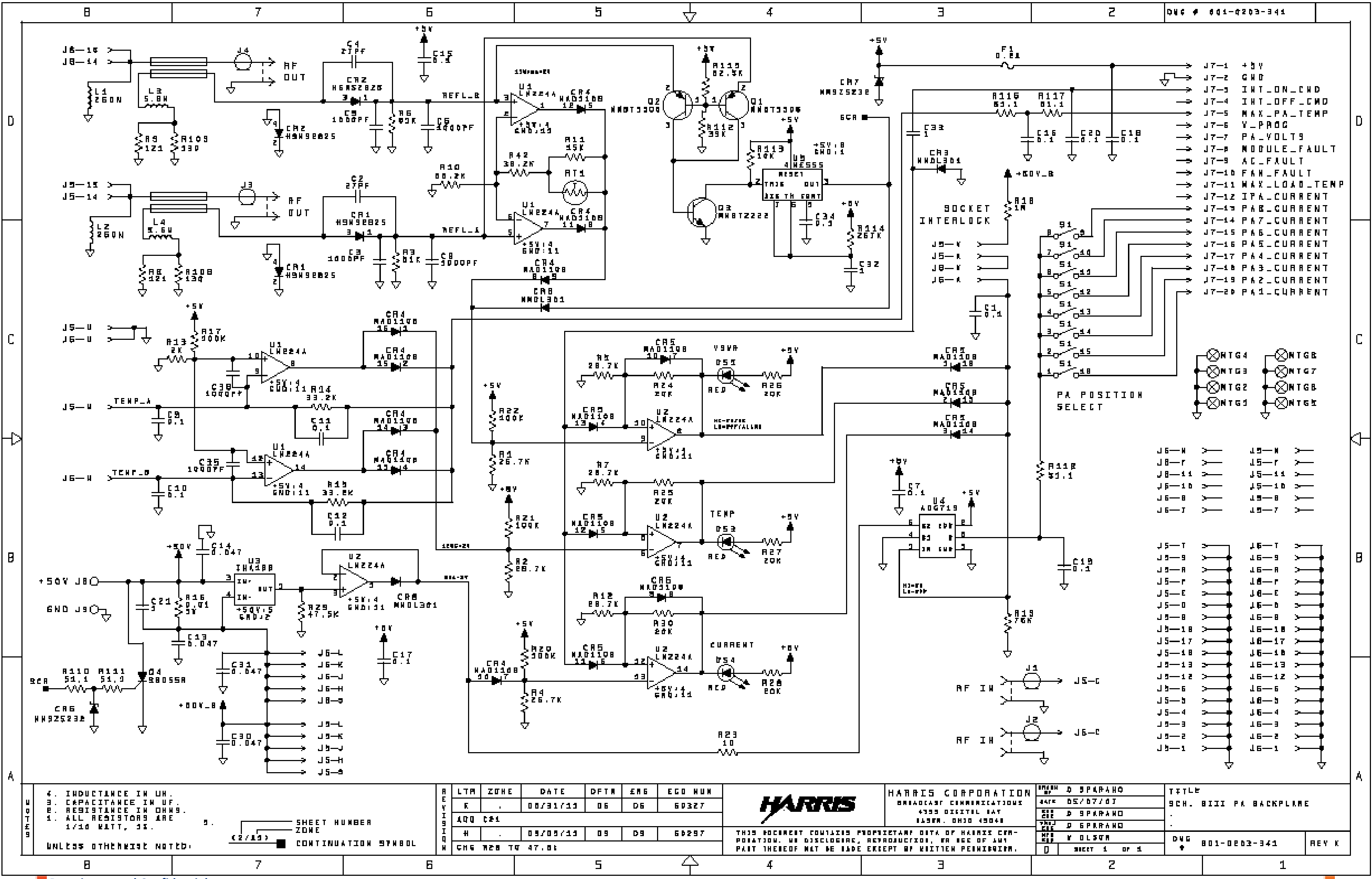
TITLE
SCHEMATIC,
BIII 8X SPLITTER
DMB670-1500

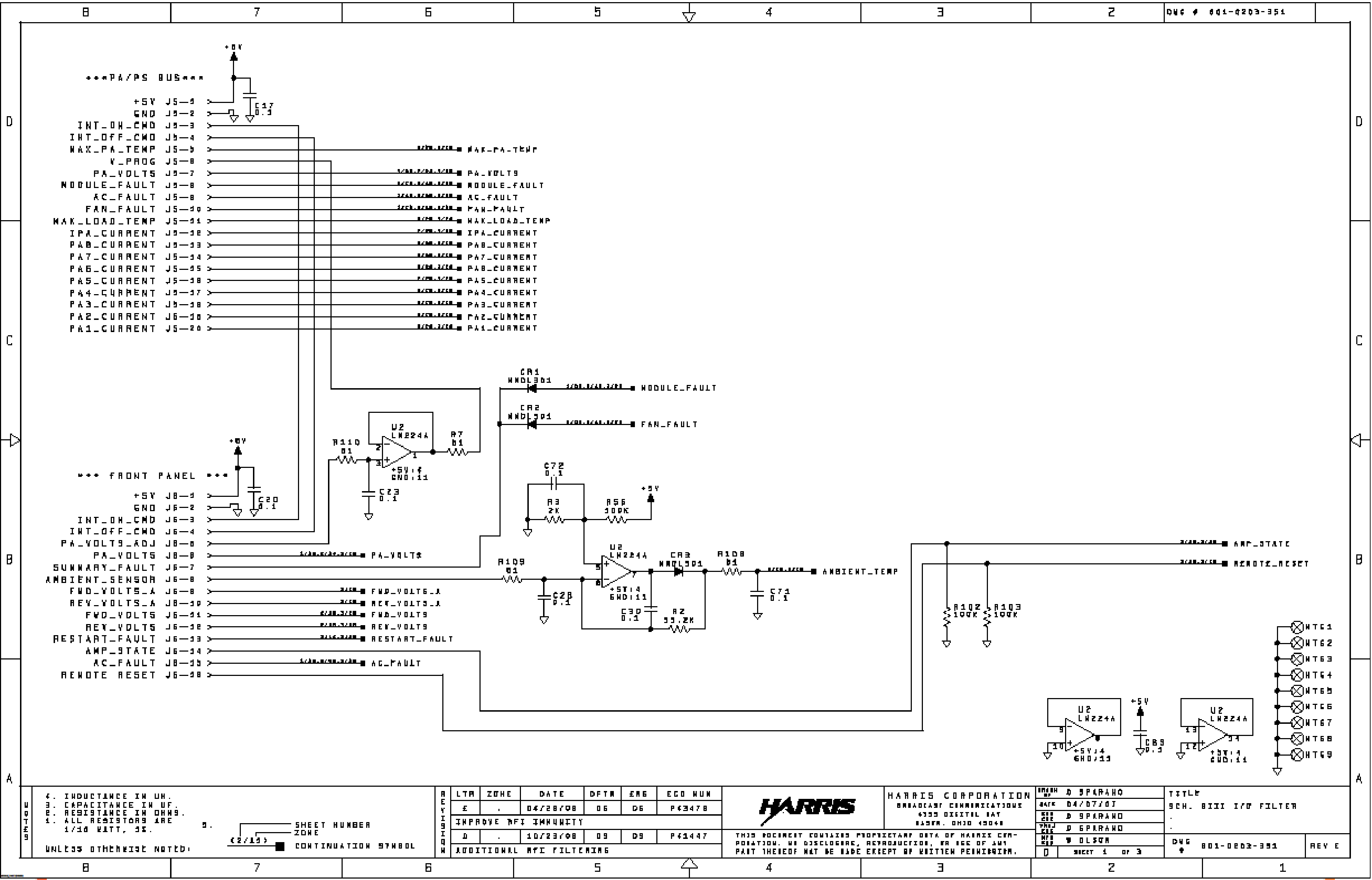
DWG NO. 801-0203-301 REV A

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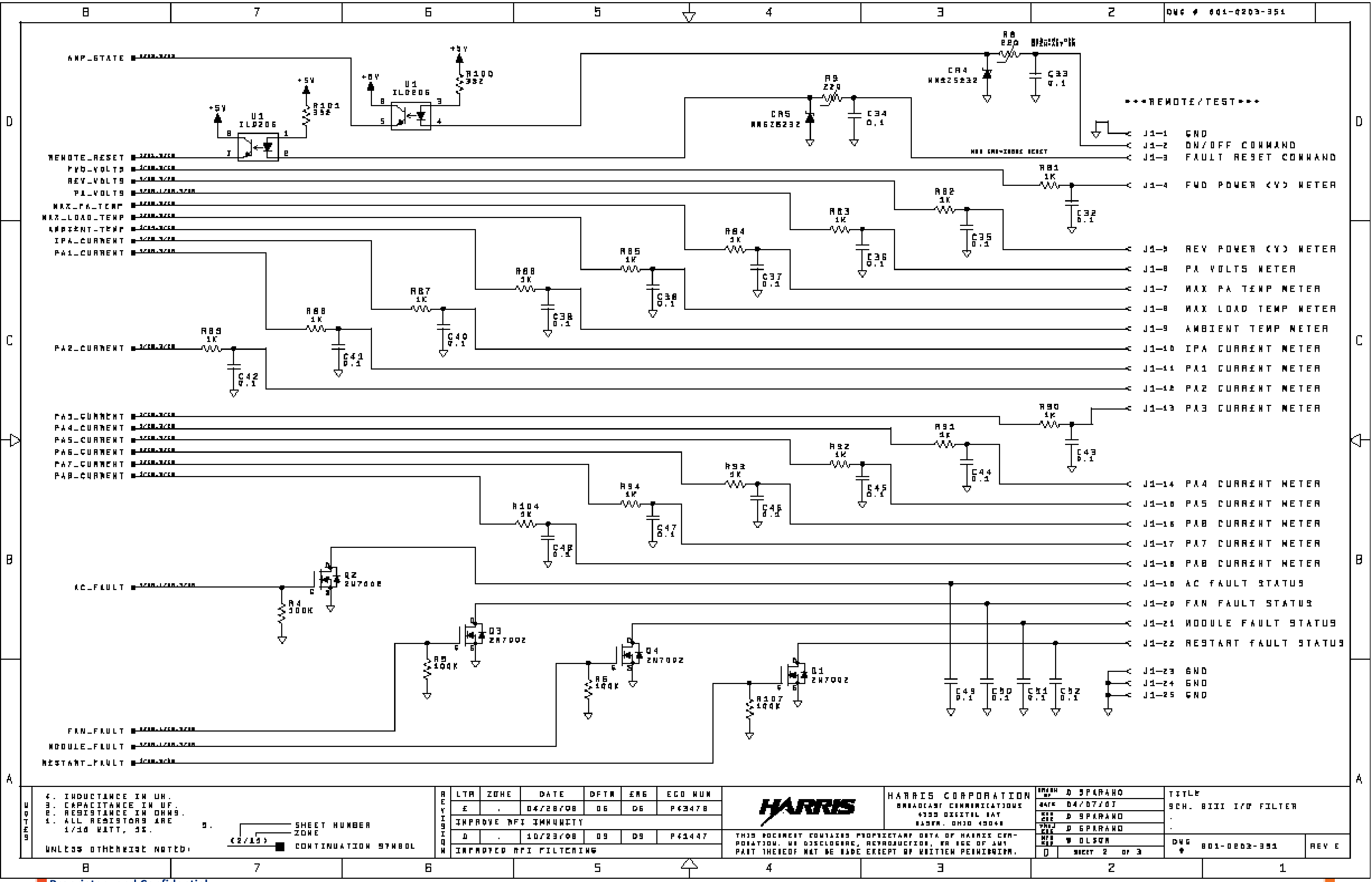

J1-1 +5V
J1-2 GND
J1-11 MAX_LOAD_TEMP
HARRIS CORPORATION
UNLESS OTHERWISE NOTED:
CONTINUATION SYMBOL
SHEET NUMBER
ZONE

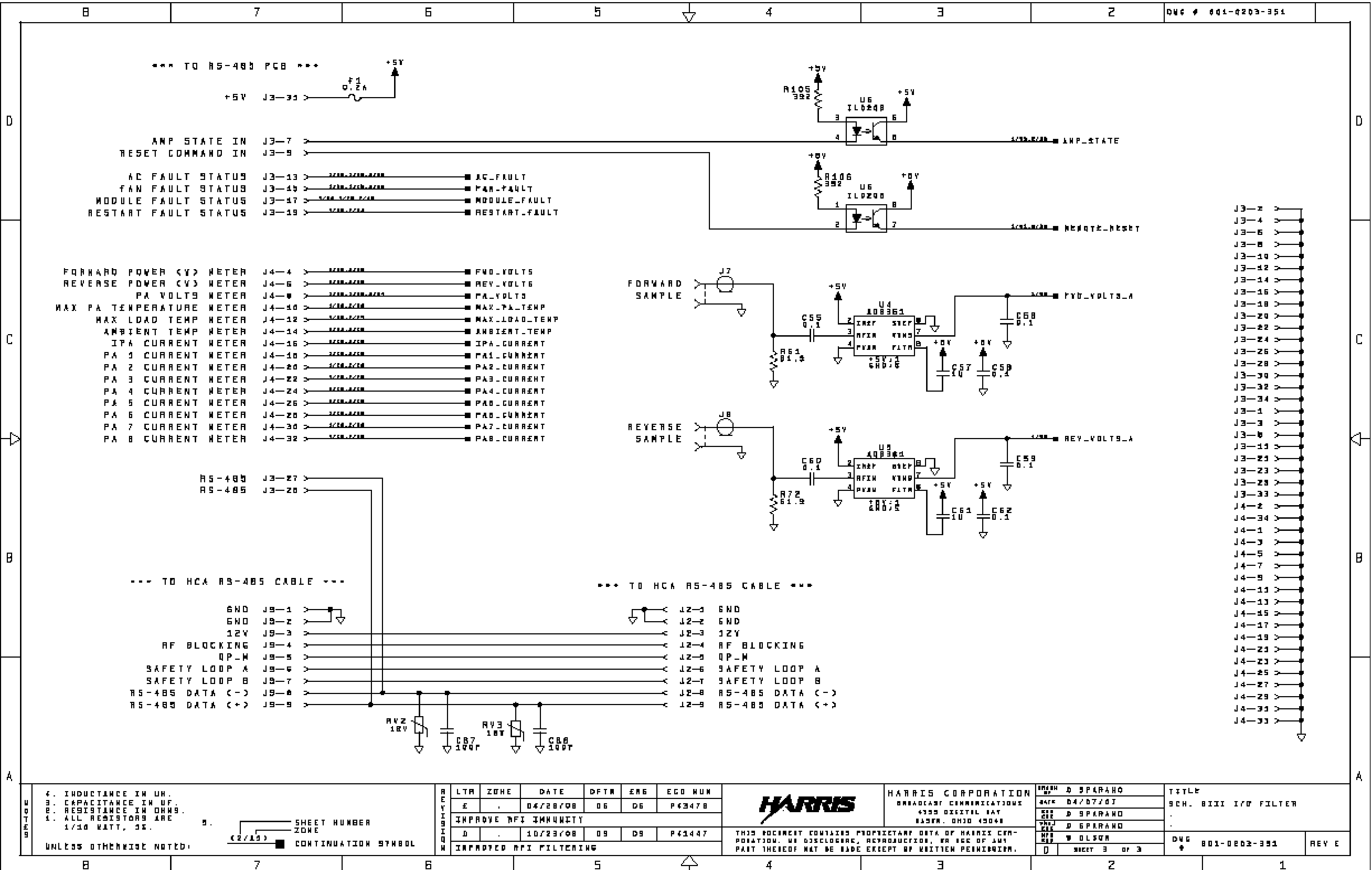

CURRENT SAMPLES
20A - 4V +/-.250mV
SOCKET INTERLOCK
DC+ (50V)
DC- (0V)
SHARED_50V
SHARED_0V
PAB_CURRENT
PA7_CURRENT
PA6_CURRENT
MODULE_FAULT
INT_OFF_CMD
INH_ON_CMD
PS ON/OFF
AC MAINS (ACN1)
AC MAINS (ACL1)
AC_FAULT
AC LOW SENSOR
HARRIS CORPORATION
SCH. BIII BE PS INTERFACE
801-0203-331
UNLESS OTHERWISE NOTED:
1. ALL RESISTORS ARE 1/10 WATT, 5%.
2. RESISTANCE IN OHMS.
3. CAPACITANCE IN UF.
4. INDUCTANCE IN UH.
SHEET NUMBER
ZONE
CONTINUATION SYMBOL
IMPROVE RFI IMMUNITY

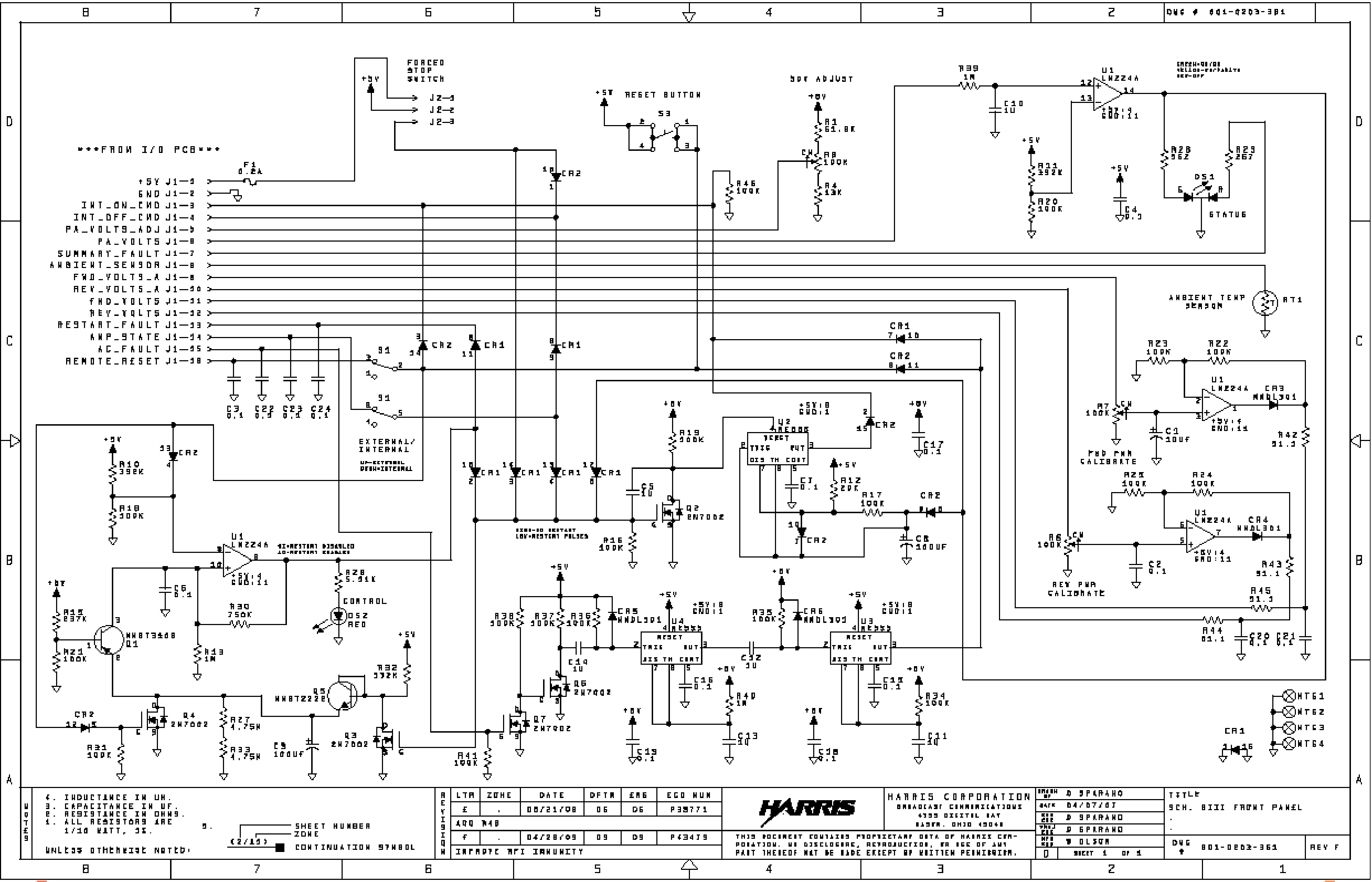

HARRIS CORPORATION
SCH. BIII PA BACKPLANE
801-0203-341

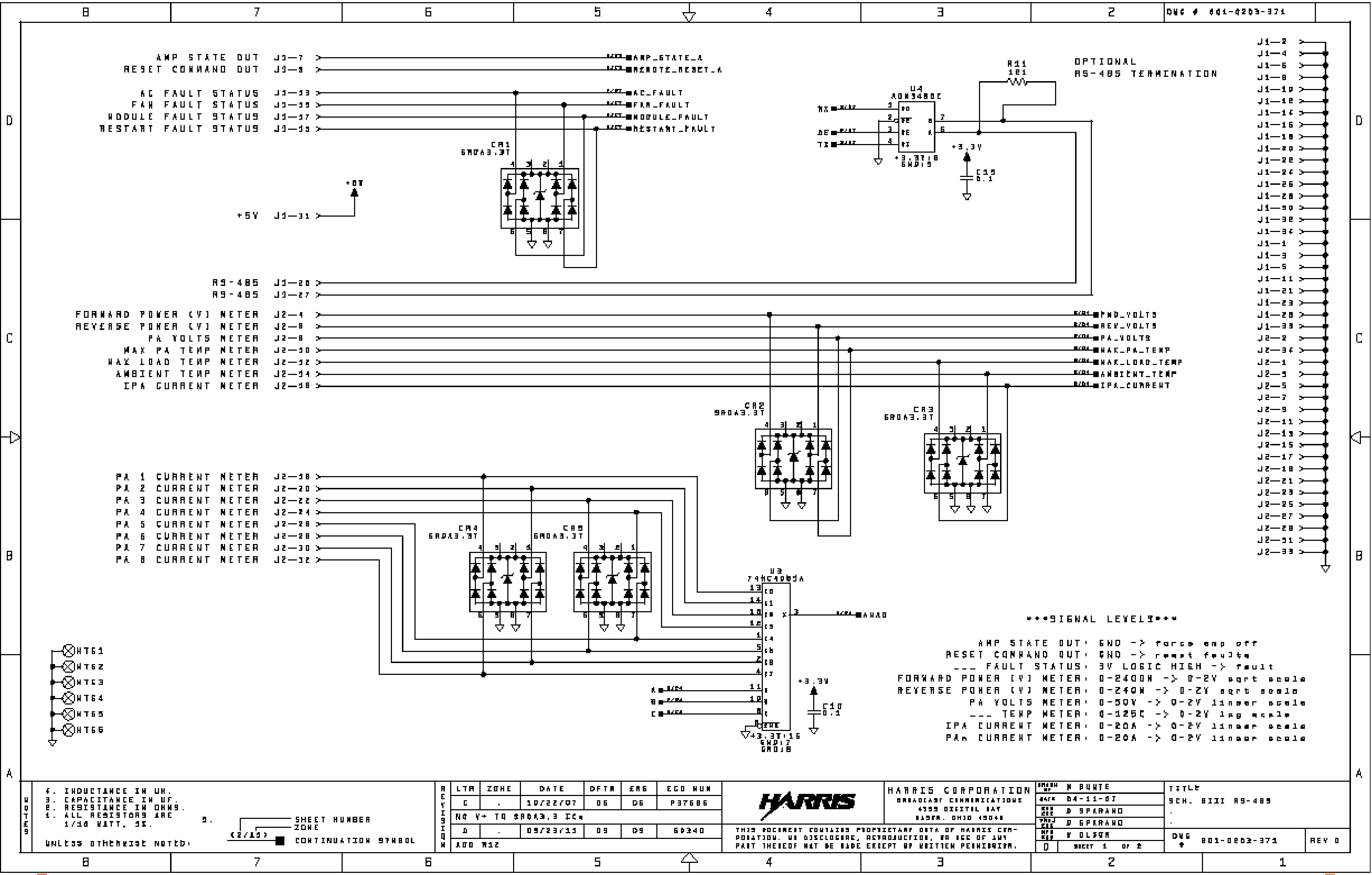


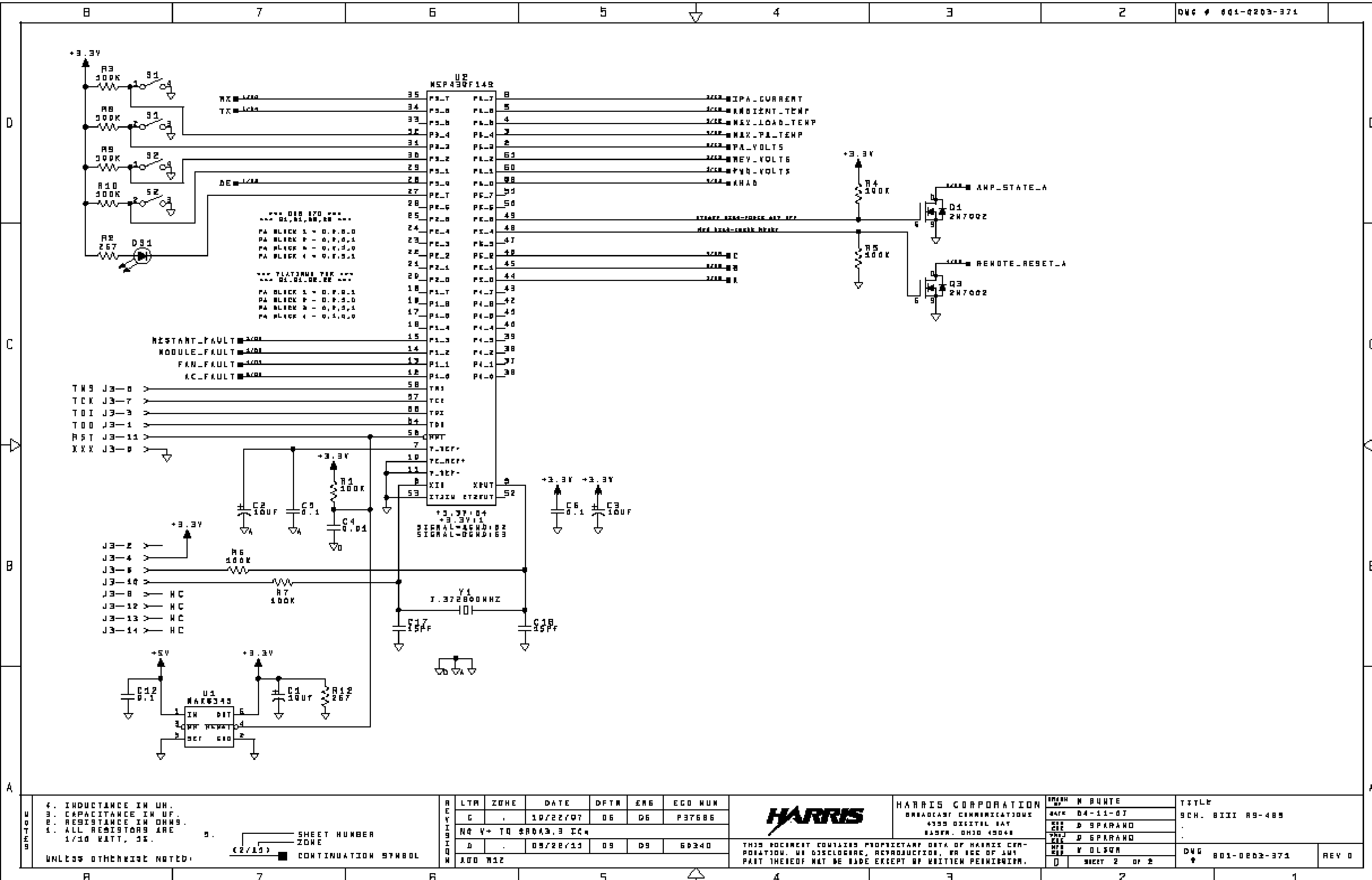
DWG # 801-0203-351
PA/PS BUS
+5V J5-1
GND J5-2
INT_ON_CMD J5-3
INT_OFF_CMD J5-4
MAX_PA_TEMP J5-5
V_PROG J5-6
PA_VOLTS J5-7
MODULE_FAULT J5-8
AC_FAULT J5-9
FAN_FAULT J5-10
MAX_LOAD_TEMP J5-11
IPA_CURRENT J5-12
PA8_CURRENT J5-13
PA7_CURRENT J5-14
PA6_CURRENT J5-15
PA5_CURRENT J5-16
PA4_CURRENT J5-17
PA3_CURRENT J5-18
PA2_CURRENT J5-19
PA1_CURRENT J5-20
*** FRONT PANEL ***
+5V J6-1
GND J6-2
INT_ON_CMD J6-3
INT_OFF_CMD J6-4
PA_VOLTS_ADJ J6-5
PA_VOLTS J6-6
SUMMARY_FAULT J6-7
AMBIENT_SENSOR J6-8
FWD_VOLTS_A J6-9
REV_VOLTS_A J6-10
FWD_VOLTS J6-11
REV_VOLTS J6-12
RESTART_FAULT J6-13
AMP_STATE J6-14
AC_FAULT J6-15
REMOTE RESET J6-16
MODULE_FAULT
FAN_FAULT
AMBIENT_TEMP
AMP_STATE
REMOTE_RESET
U2 LM224A
HARRIS CORPORATION
TITLE SCH. BIII I/O FILTER
DWG 801-0203-351
REV E
SHEET 1 OF 3
IMPROVE RFI IMMUNITY
ADDITIONAL RFI FILTERING
UNLESS OTHERWISE NOTED:


DWG # 801-0203-351
REMOTE/TEST
J1-1 GND
J1-2 ON/OFF COMMAND
J1-3 FAULT RESET COMMAND
J1-4 FWD POWER (V) METER
J1-5 REV POWER (V) METER
J1-6 PA VOLTS METER
J1-7 MAX PA TEMP METER
J1-8 MAX LOAD TEMP METER
J1-9 AMBIENT TEMP METER
J1-10 IPA CURRENT METER
J1-11 PA1 CURRENT METER
J1-12 PA2 CURRENT METER
J1-13 PA3 CURRENT METER
J1-14 PA4 CURRENT METER
J1-15 PA5 CURRENT METER
J1-16 PA6 CURRENT METER
J1-17 PA7 CURRENT METER
J1-18 PA8 CURRENT METER
J1-19 AC FAULT STATUS
J1-20 FAN FAULT STATUS
J1-21 MODULE FAULT STATUS
J1-22 RESTART FAULT STATUS
J1-23 GND
J1-24 GND
J1-25 GND
AMP_STATE
REMOTE_RESET
FWD_VOLTS
REV_VOLTS
PA_VOLTS
MAX_PA_TEMP
MAX_LOAD_TEMP
AMBIENT_TEMP
IPA_CURRENT
PA1_CURRENT
PA2_CURRENT
PA3_CURRENT
PA4_CURRENT
PA5_CURRENT
PA6_CURRENT
PA7_CURRENT
PA8_CURRENT
AC_FAULT
FAN_FAULT
MODULE_FAULT
RESTART_FAULT
U1 ILD206
R101 332
R100 332
R8 220
R9 220
CR4 MMSZ5232
CR5 MMSZ5232
C33 0.1
C34 0.1
Q2 2N7002
Q3 2N7002
Q4 2N7002
Q1 2N7002
R4 100K
R5 100K
R6 100K
R107 100K
4. INDUCTANCE IN UH.
3. CAPACITANCE IN UF.
2. RESISTANCE IN OHMS.
1. ALL RESISTORS ARE 1/16 WATT, 5%.
UNLESS OTHERWISE NOTED:
SHEET NUMBER
ZONE
CONTINUATION SYMBOL
IMPROVE RFI IMMUNITY
IMPROVED RFI FILTERING
HARRIS CORPORATION
BROADCAST COMMUNICATIONS
TITLE
SCH. BIII I/O FILTER
DWG # 801-0203-351
REV E
SHEET 2 OF 3

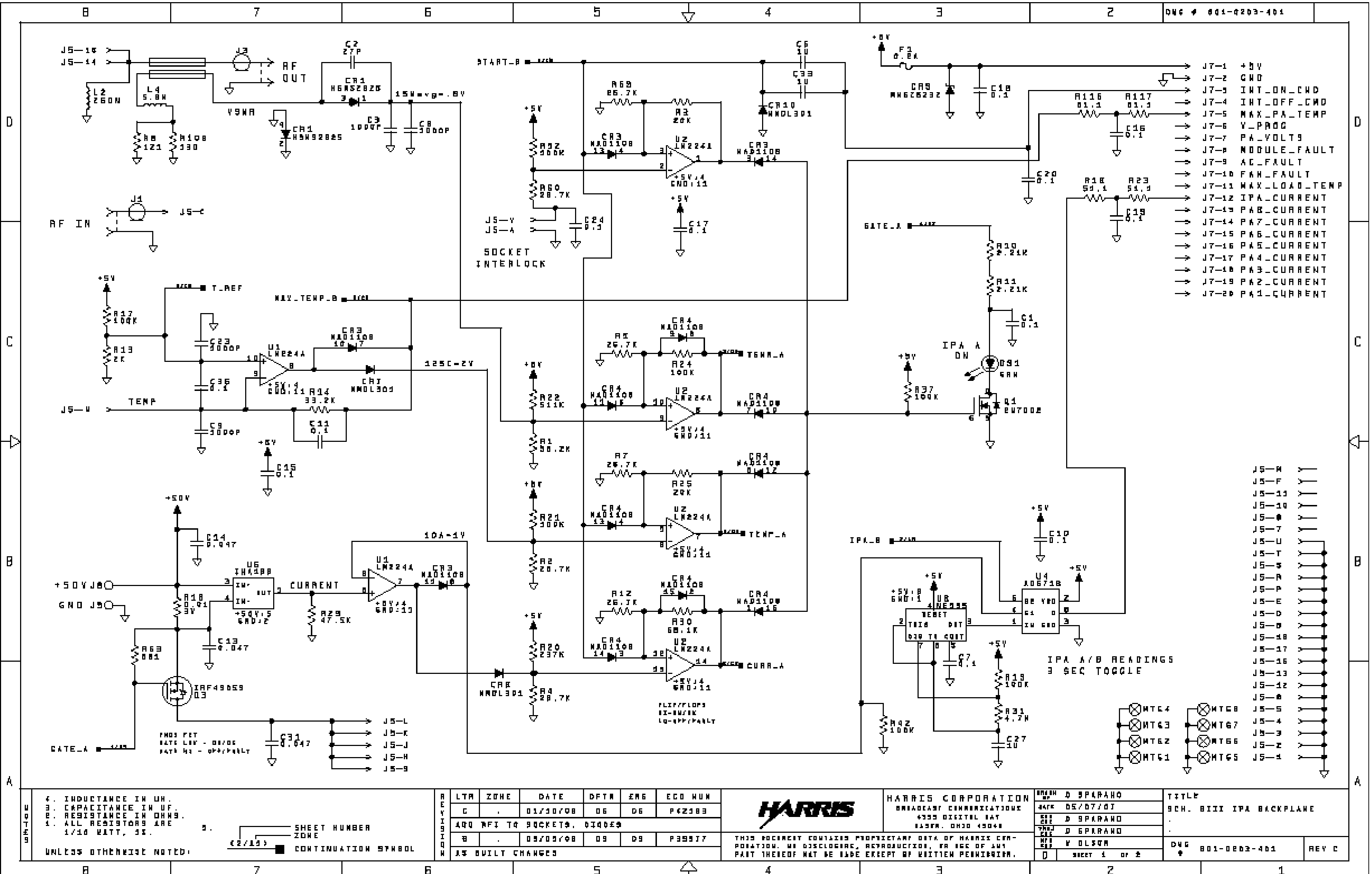

*** TO RS-485 PCB ***
AMP STATE IN J3-7
RESET COMMAND IN J3-9
AC FAULT STATUS J3-13
FAN FAULT STATUS J3-15
MODULE FAULT STATUS J3-17
RESTART FAULT STATUS J3-19
FORWARD POWER (V) METER J4-4
REVERSE POWER (V) METER J4-6
PA VOLTS METER J4-8
MAX PA TEMPERATURE METER J4-10
MAX LOAD TEMP METER J4-12
AMBIENT TEMP METER J4-14
IPA CURRENT METER J4-16
FORWARD SAMPLE
REVERSE SAMPLE
RS-485 J3-27
RS-485 J3-28
--- TO HCA RS-485 CABLE ---
*** TO HCA RS-485 CABLE ***
GND
12V
RF BLOCKING
OP_M
SAFETY LOOP A
SAFETY LOOP B
RS-485 DATA (-)
RS-485 DATA (+)
HARRIS CORPORATION
SCH. BIII I/O FILTER
DWG 801-0203-351
REV E

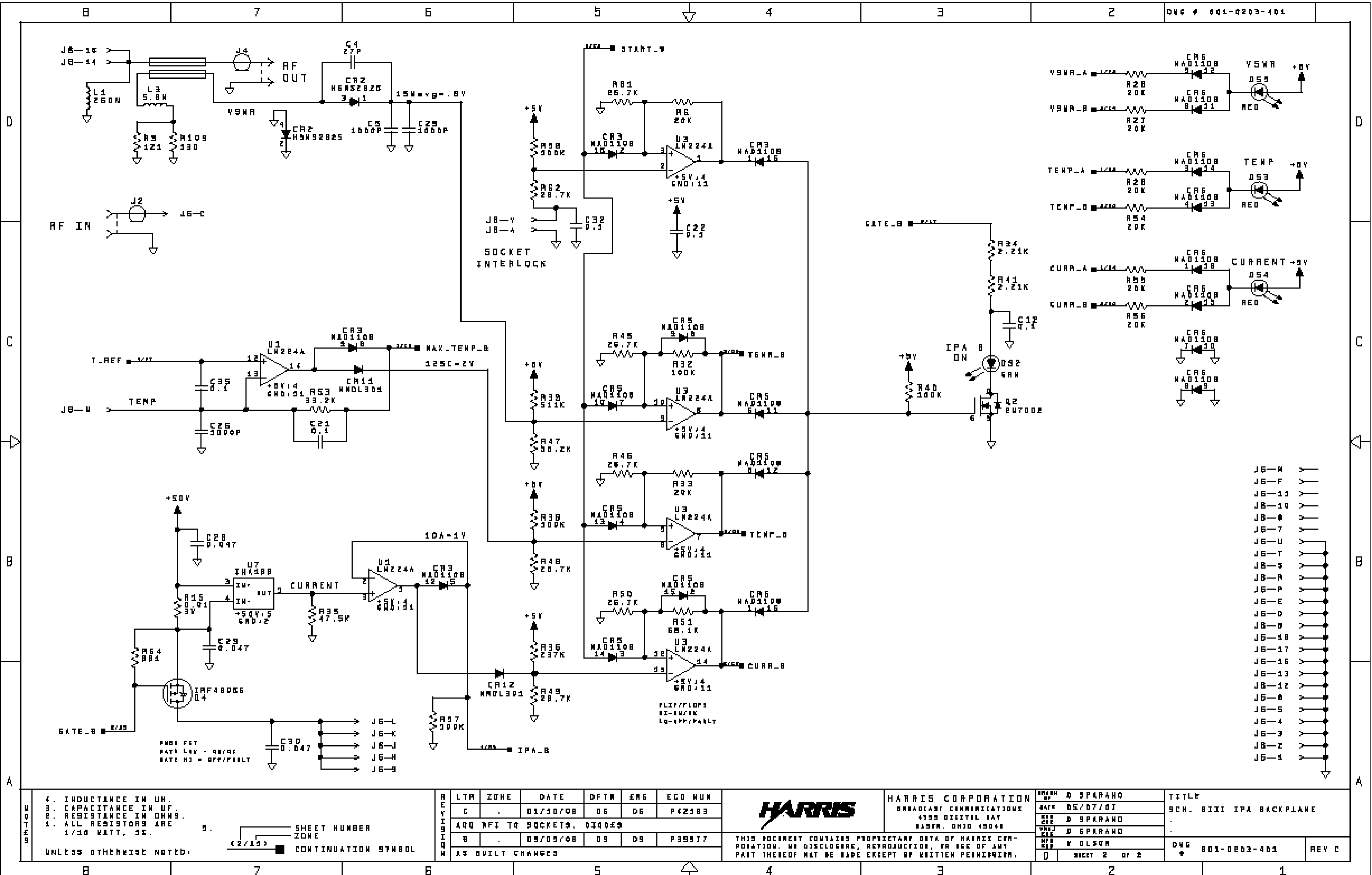

FROM I/O PCB
FORCED STOP SWITCH
RESET BUTTON
STATUS
AMBIENT TEMP SENSOR
FWD PWR CALIBRATE
REV PWR CALIBRATE
EXTERNAL/ INTERNAL
CONTROL
HARRIS CORPORATION
SCH. BIII FRONT PANEL
801-0203-361
REV F
UNLESS OTHERWISE NOTED:
SHEET NUMBER
ZONE
CONTINUATION SYMBOL

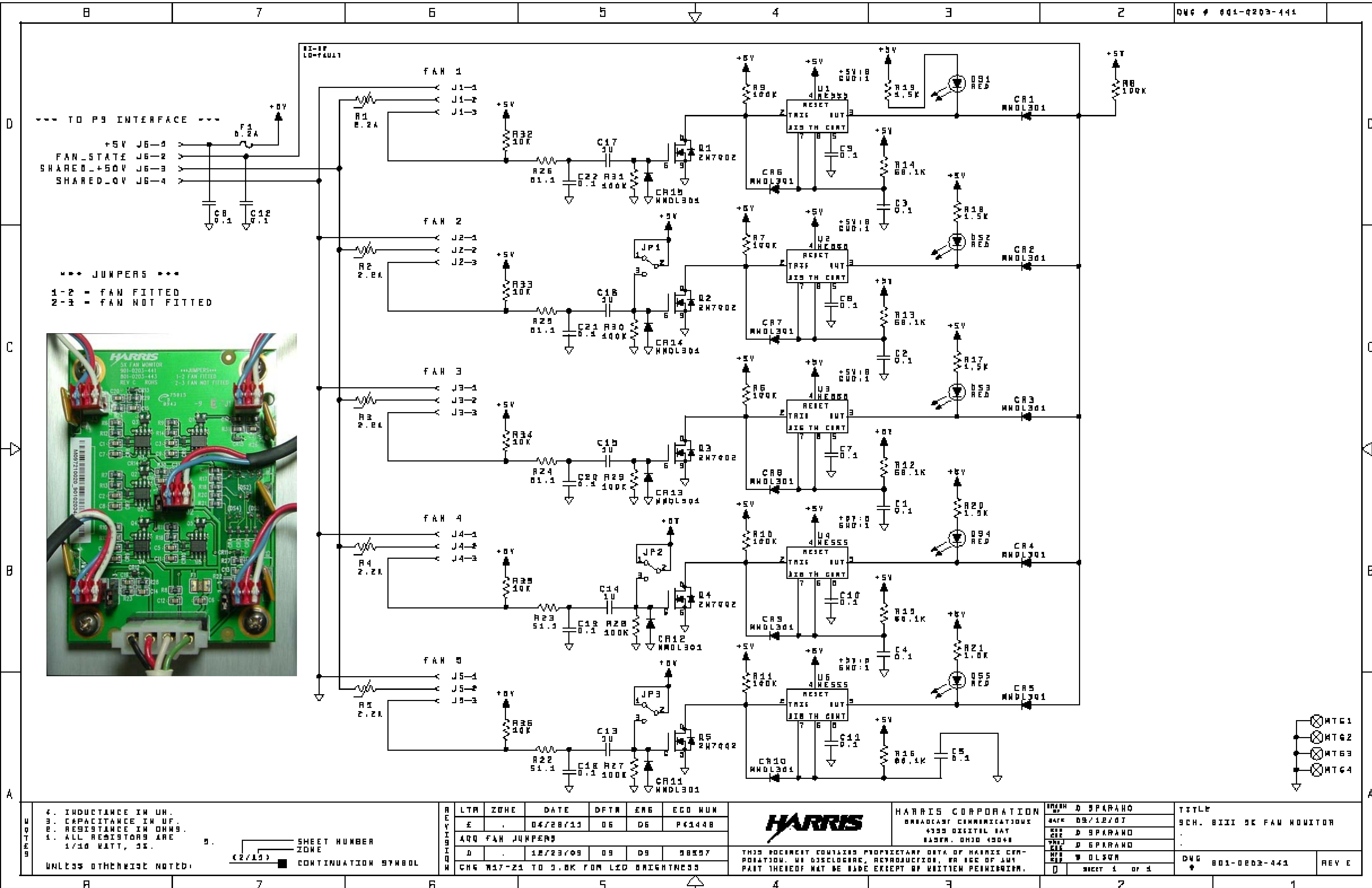

AMP STATE OUT J1—7
RESET COMMAND OUT J1—9
AC FAULT STATUS J1—13
FAN FAULT STATUS J1—15
MODULE FAULT STATUS J1—17
RESTART FAULT STATUS J1—19
+5V J1—31
RS-485 J1—20
RS-485 J1—27
FORWARD POWER (V) METER J2—4
REVERSE POWER (V) METER J2—6
PA VOLTS METER J2—8
MAX PA TEMP METER J2—10
MAX LOAD TEMP METER J2—12
AMBIENT TEMP METER J2—14
IPA CURRENT METER J2—16
PA 1 CURRENT METER J2—18
PA 2 CURRENT METER J2—20
PA 3 CURRENT METER J2—22
PA 4 CURRENT METER J2—24
PA 5 CURRENT METER J2—26
PA 6 CURRENT METER J2—28
PA 7 CURRENT METER J2—30
PA 8 CURRENT METER J2—32
OPTIONAL RS-485 TERMINATION
SIGNAL LEVELS
AMP STATE OUT: GND -> force amp off
RESET COMMAND OUT: GND -> reset faults
___ FAULT STATUS: 3V LOGIC HIGH -> fault
FORWARD POWER (V) METER: 0-2400W -> 0-2V sqrt scale
REVERSE POWER (V) METER: 0-240W -> 0-2V sqrt scale
PA VOLTS METER: 0-50V -> 0-2V linear scale
___ TEMP METER: 0-125C -> 0-2V log scale
IPA CURRENT METER: 0-20A -> 0-2V linear scale
PAn CURRENT METER: 0-20A -> 0-2V linear scale
HARRIS CORPORATION
TITLE SCH, BIII RS-485
DWG 801-0203-371
REV D
SHEET 1 OF 2
UNLESS OTHERWISE NOTED:

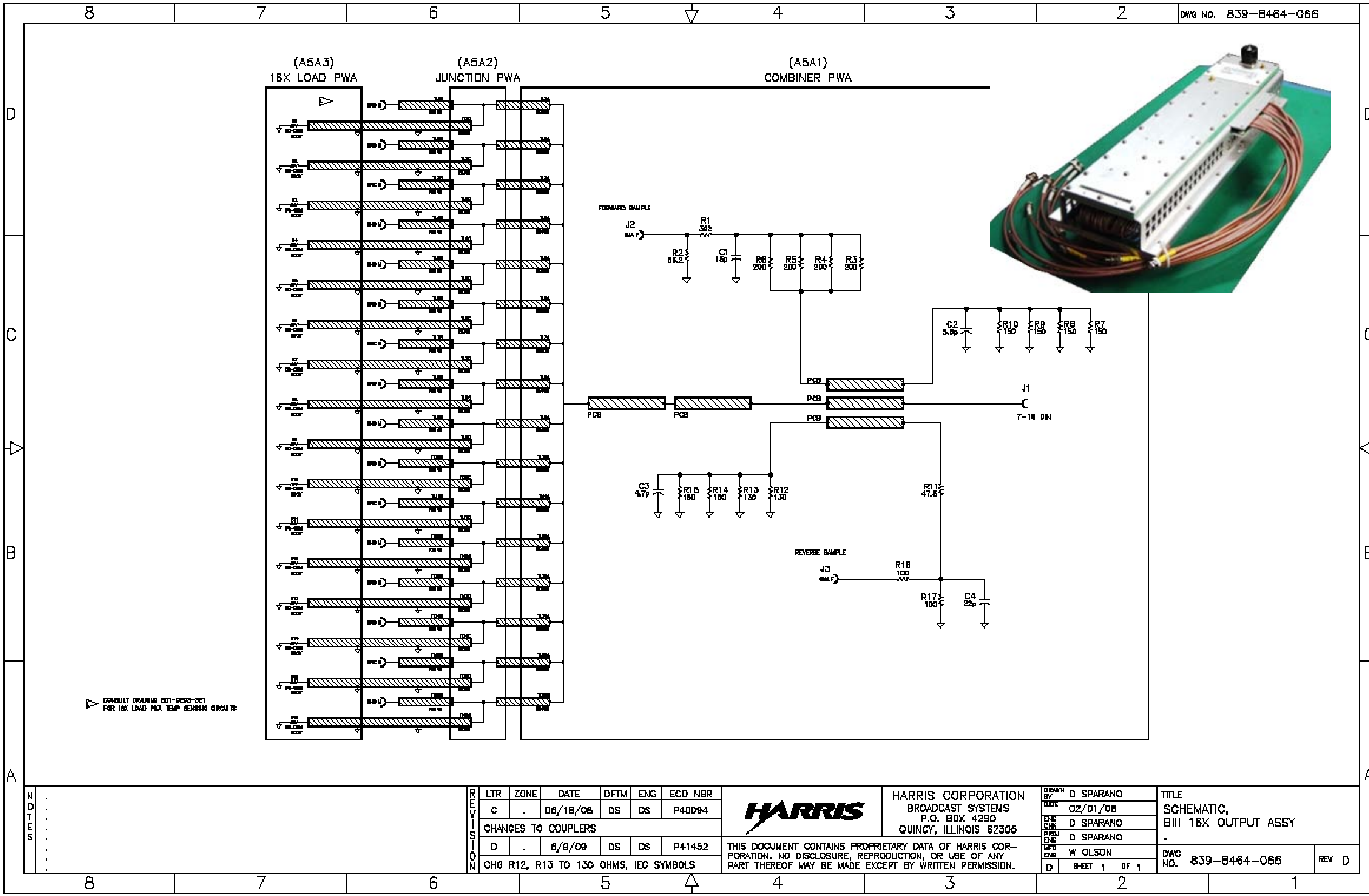


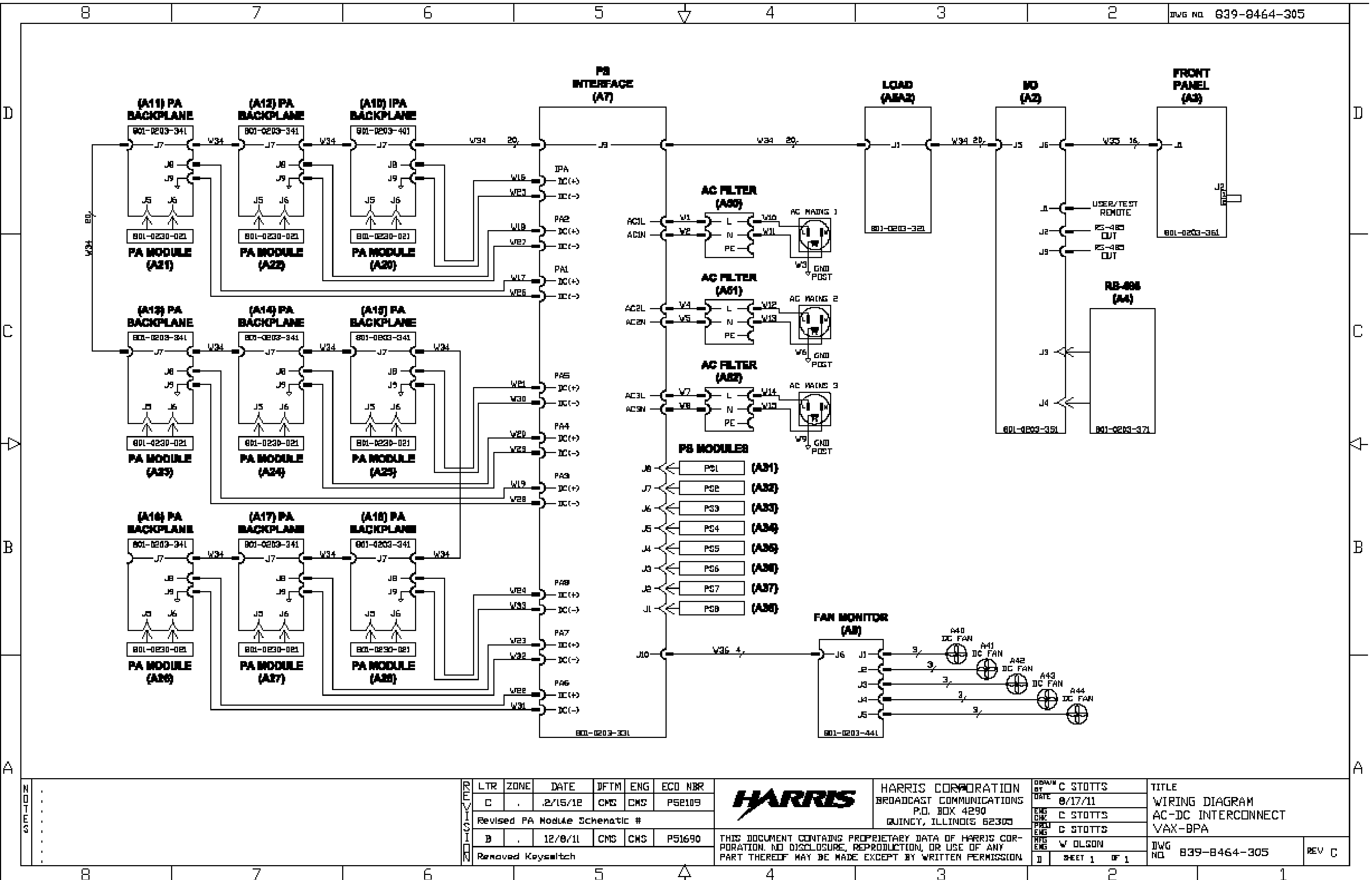
U2
MSP430F149
+3.3V
RESTART_FAULT
MODULE_FAULT
FAN_FAULT
AC_FAULT
IPA_CURRENT
AMBIENT_TEMP
MAX_LOAD_TEMP
MAX_PA_TEMP
PA_VOLTS
REV_VOLTS
FWD_VOLTS
AMP_STATE_A
REMOTE_RESET_A
2N7002
Y1
U1
HARRIS CORPORATION
UNLESS OTHERWISE NOTED:
SHEET NUMBER
ZONE
CONTINUATION SYMBOL
SCH, BIII RS-485
801-0203-371

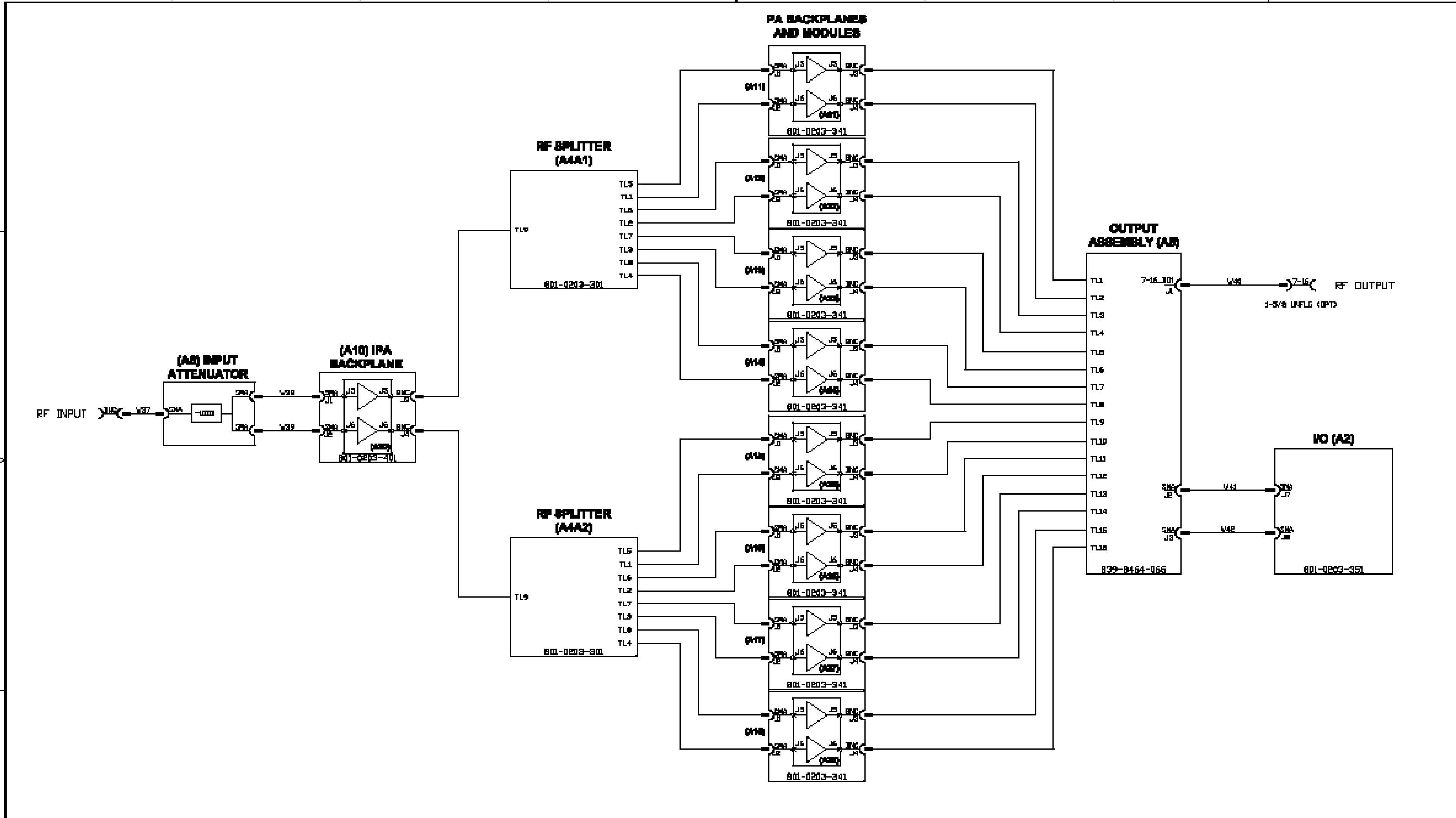

RF OUT
RF IN
SOCKET INTERLOCK
TEMP
CURRENT
IPA A ON
IPA A/B READINGS
3 SEC TOGGLE
J7-1 +5V
J7-2 GND
J7-3 INT_ON_CMD
J7-4 INT_OFF_CMD
J7-5 MAX_PA_TEMP
J7-6 V_PROG
J7-7 PA_VOLTS
J7-8 MODULE_FAULT
J7-9 AC_FAULT
J7-10 FAN_FAULT
J7-11 MAX_LOAD_TEMP
J7-12 IPA_CURRENT
4. INDUCTANCE IN UH.
3. CAPACITANCE IN UF.
2. RESISTANCE IN OHMS.
1. ALL RESISTORS ARE 1/10 WATT, 5%.
UNLESS OTHERWISE NOTED:
SHEET NUMBER
ZONE
CONTINUATION SYMBOL
HARRIS CORPORATION
AS BUILT CHANGES
DWG 801-0203-401
REV C


DWG # 801-0203-401
START_B
R61 26.7K
R6 20K
CR3 MAD1108
U3 LM224A
+5V:4 GND:11
C22 0.1
C32 0.1
R58 100K
R62 28.7K
J8—Y
J8—X
SOCKET INTERLOCK
C4 27P
CR2 HSMS2820
15W=vg=.8V
C5 1000P
C29 1000P
J4
RF OUT
VSWR
L1 260N
L3 5.8N
R9 121
R109 130
RF IN
J2
VSWR_A
VSWR_B
R26 20K
R27 20K
CR6 MAD1108
DS5 RED
TEMP_A
TEMP_B
R28 20K
R54 20K
DS3 RED
TEMP
CURRENT
CURR_A
CURR_B
R55 20K
R56 20K
DS4 RED
GATE_B
R34 2.21K
R41 2.21K
C12 0.1
IPA B ON
DS2 GRN
R40 100K
Q2 2N7002
T_REF
U1 LM224A
MAX_TEMP_B
125C=2V
CR11 MMBD301
R53 33.2K
C21 0.1
C35 0.1
C26 3300P
R45 26.7K
R32 100K
VSWR_B
CR5 MAD1108
R39 511K
R47 30.2K
R46 26.7K
R33 20K
R38 100K
R48 20.7K
TEMP_B
R50 26.7K
R51 68.1K
CURR_B
R36 237K
R49 28.7K
CR12 MMBD301
R57 100K
IPA_B
+50V
C28 0.047
U7 INA168
R15 0.01 3W
C29 0.047
R35 47.5K
10A=1V
R64 681
IRF4806G Q4
GATE_B
C30 0.047
HARRIS
HARRIS CORPORATION
TITLE SCH. BIII IPA BACKPLANE
DWG # 801-0203-401
4. INDUCTANCE IN UH.
3. CAPACITANCE IN UF.
2. RESISTANCE IN OHMS.
1. ALL RESISTORS ARE 1/10 WATT, 1%.
UNLESS OTHERWISE NOTED:
SHEET NUMBER
ZONE
CONTINUATION SYMBOL


--- TO PS INTERFACE ---
+5V J6-1
FAN_STATE J6-2
SHARED_+50V J6-3
SHARED_0V J6-4
FAN 1
FAN 2
FAN 3
FAN 4
FAN 5
*** JUMPERS ***
1-2 = FAN FITTED
2-3 = FAN NOT FITTED
4. INDUCTANCE IN UH.
3. CAPACITANCE IN UF.
2. RESISTANCE IN OHMS.
1. ALL RESISTORS ARE 1/10 WATT, 5%.
UNLESS OTHERWISE NOTED:
SHEET NUMBER
ZONE
CONTINUATION SYMBOL
ADD FAN JUMPERS
HARRIS
HARRIS CORPORATION
BROADCAST COMMUNICATIONS
TITLE
SCH. 5X FAN MONITOR


DWG NO. 839-8464-066
(A5A3)
16X LOAD PWA
(A5A2)
JUNCTION PWA
(A5A1)
COMBINER PWA
FORWARD SAMPLE
J2
R1
R2
C1
R6 200
R5 200
R4 200
R3 200
C2
R10 150
R9 150
R8 150
R7 150
J1
7-16 DIN
PCB
C3
R15 180
R14 180
R13 130
R12 130
R11 47.5
REVERSE SAMPLE
J3
R18
R17 100
C4
LTR ZONE DATE DFTM ENG ECO NBR
C - 08/18/08 DS DS P40094
CHANGES TO COUPLERS
D - 8/8/09 DS DS P41452
CHG R12, R13 TO 130 OHMS, IEC SYMBOLS
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D SPARANO
02/01/08
D SPARANO
D SPARANO
W OLSON
SHEET 1 OF 1
TITLE
SCHEMATIC,
BIII 16X OUTPUT ASSY
DWG NO. 839-8464-066
REV D


PS INTERFACE (A7)
(A11) PA BACKPLANE
(A12) PA BACKPLANE
(A10) PA BACKPLANE
(A13) PA BACKPLANE
(A14) PA BACKPLANE
(A15) PA BACKPLANE
(A16) PA BACKPLANE
(A17) PA BACKPLANE
(A18) PA BACKPLANE
PA MODULE (A21)
PA MODULE (A22)
PA MODULE (A20)
PA MODULE (A23)
PA MODULE (A24)
PA MODULE (A25)
PA MODULE (A26)
PA MODULE (A27)
PA MODULE (A28)
LOAD (A5A2)
I/O (A2)
FRONT PANEL (A3)
RB-485 (A4)
AC FILTER (A60)
AC FILTER (A61)
AC FILTER (A62)
AC MAINS 1
AC MAINS 2
AC MAINS 3
GND POST
USER/TEST REMOTE
RS-485 OUT
PS MODULES
PS1 (A31)
PS2 (A32)
PS3 (A33)
PS4 (A34)
PS5 (A35)
PS6 (A36)
PS7 (A37)
PS8 (A38)
FAN MONITOR (A8)
A40 DC FAN
A41 DC FAN
A42 DC FAN
A43 DC FAN
A44 DC FAN
DWG NO. 839-8464-305
LTR ZONE DATE DFTM ENG ECO NBR
C . 2/15/12 CMS CMS P52109
Revised PA Module Schematic #
B . 12/8/11 CMS CMS P51690
Removed Keyswitch
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DRAWN BY C STOTTS
DATE 8/17/11
C STOTTS
C STOTTS
W OLSON
TITLE
WIRING DIAGRAM
AC-DC INTERCONNECT
VAX-8PA
DWG NO 839-8464-305
REV C
SHEET 1 OF 1



LTR	ZONE	DATE	DFTM	ENG	ECO NBR
C	.	02/01/08	CS	CS	P50640
ADDED NOTE 1					
D	.	08/18/11	CS	CS	P50501
Removed Note 2					

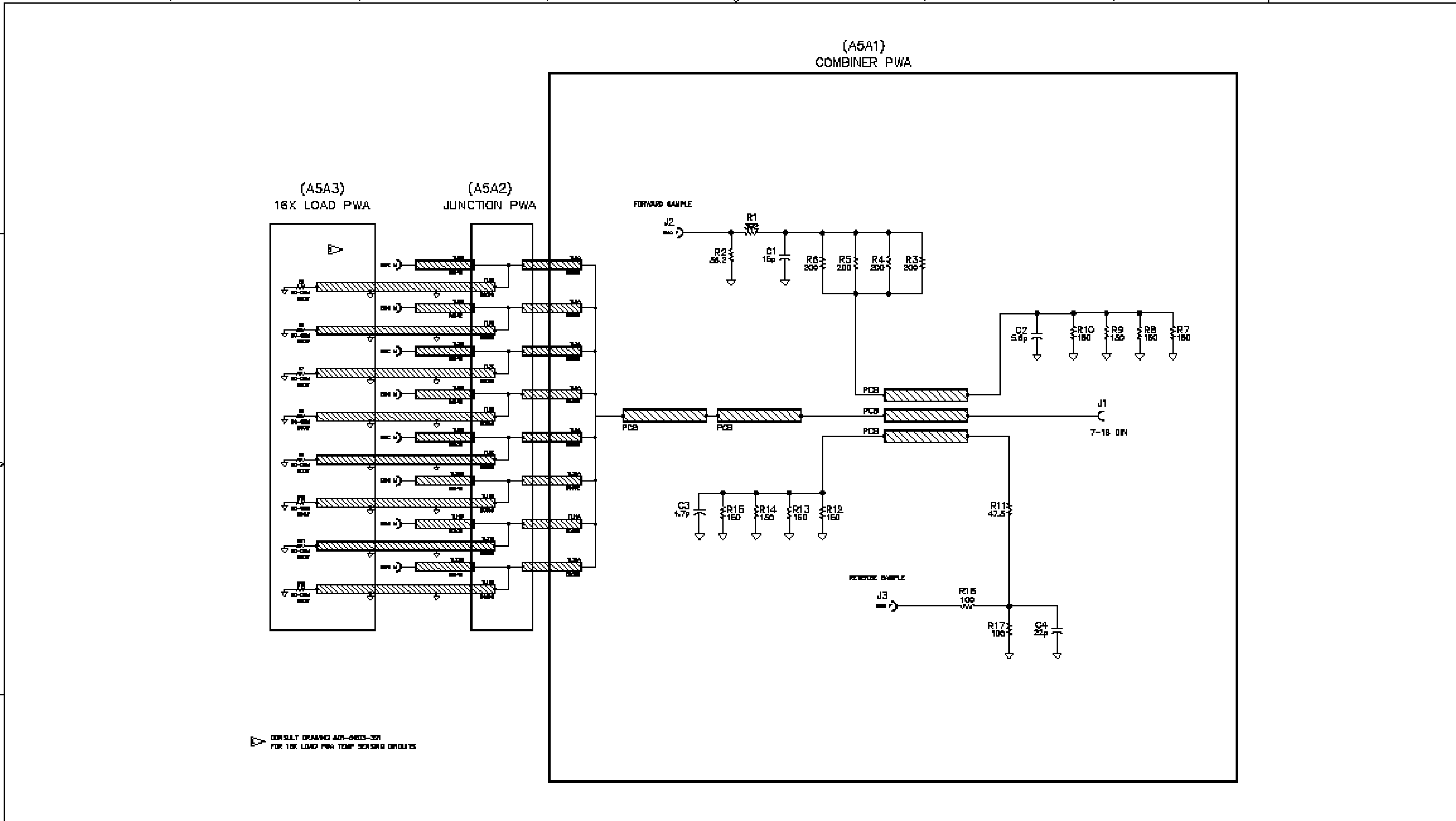
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BROADCAST COMMUNICATIONS
P.O. BOX 4290
QUINCY, ILLINOIS 62305

DRAWN BY D SPARAND
DATE 02/01/08
ENG CHK D SPARAND
PROJ ENG D SPARAND
MFG ENG W OLSON
D SHEET 1 OF 1

TITLE
WIRING DIAGRAM
RF INTERCONNECT
V 670-2000/D

DWG NO 839-8464-068 REV D



LTR	ZONE	DATE	DFTM	ENG	ECO NBR
C	.	06/03/08	DS	DS	P43877
REVERSE ON PAGE, ADOPT IEC SYMBOLS					
B	.	08/18/08	DS	DS	P40094
CHANGES TO COUPLERS					

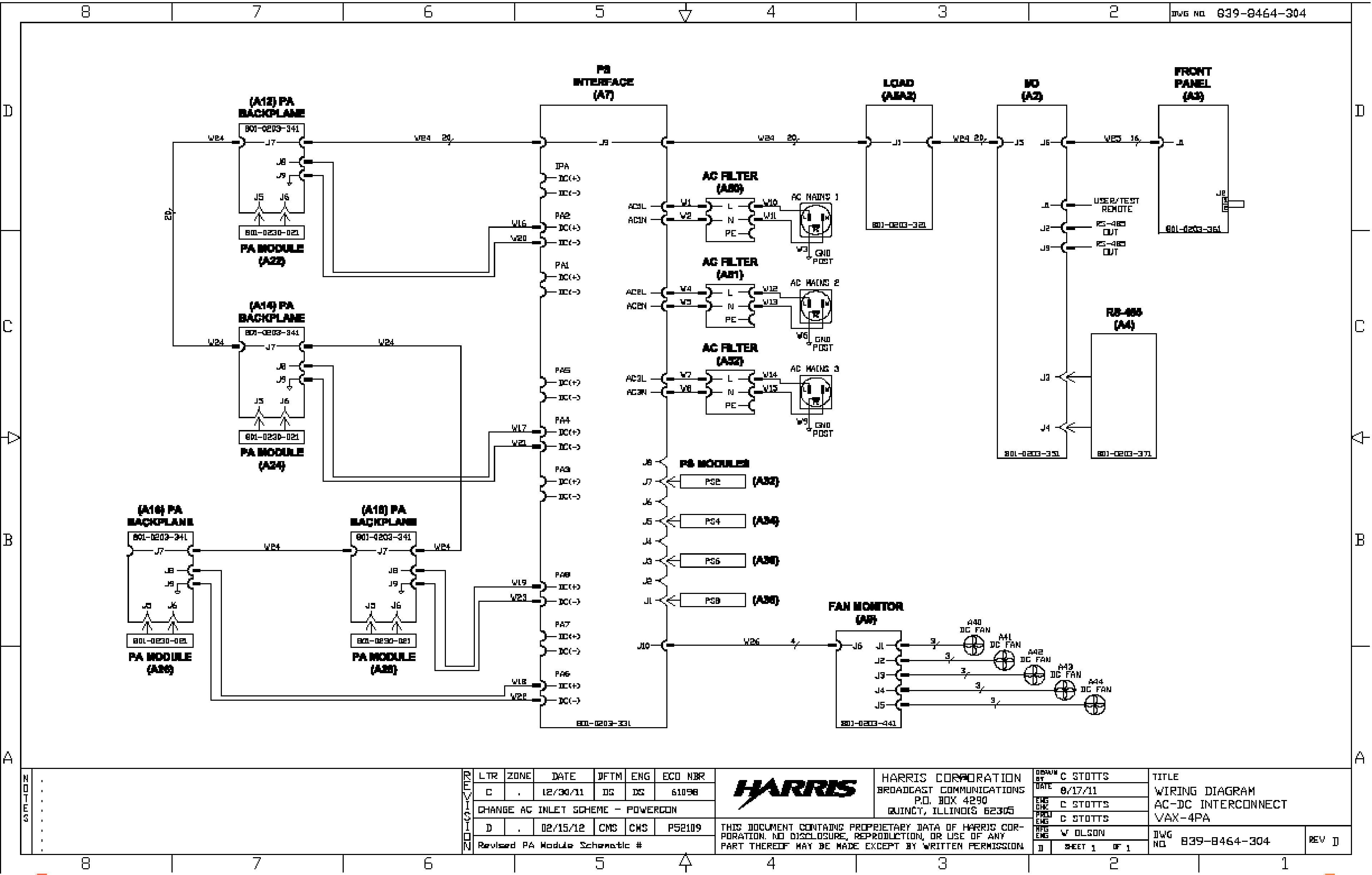
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P.O. BOX 4290
QUINCY, ILLINOIS 62305

DRAWN BY: D SPARANO
DATE: 02/01/08
D SPARANO
D SPARANO
W OLSON
D SHEET 1 OF 1

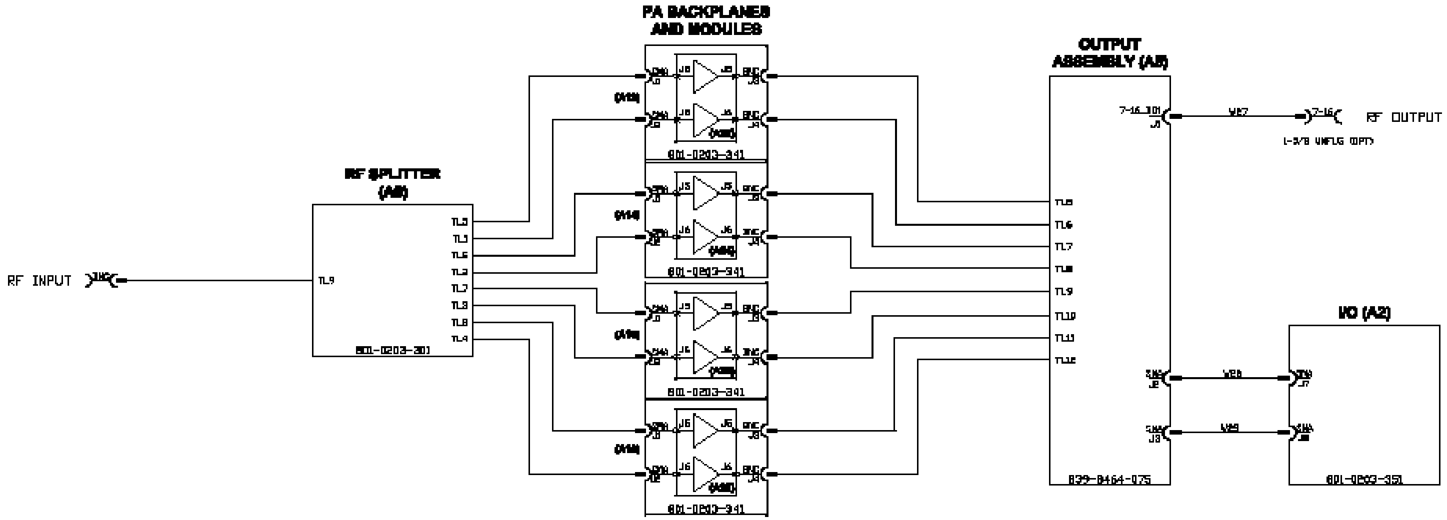
TITLE
SCHEMATIC,
BIII 8X OUTPUT ASSY

DWG NO. 839-8464-075 REV C



DWG NO 839-8464-304
PS INTERFACE (A7)
801-0203-331
LOAD (A5A2)
801-0203-321
I/O (A2)
801-0203-351
FRONT PANEL (A3)
801-0203-361
RS-485 (A4)
801-0203-371
(A12) PA BACKPLANE
(A14) PA BACKPLANE
(A16) PA BACKPLANE
(A18) PA BACKPLANE
801-0203-341
PA MODULE (A22)
PA MODULE (A24)
PA MODULE (A26)
PA MODULE (A28)
801-0230-021
AC FILTER (A30)
AC FILTER (A31)
AC FILTER (A32)
AC MAINS 1
AC MAINS 2
AC MAINS 3
GND POST
PS MODULES
PS2 (A32)
PS4 (A34)
PS6 (A36)
PS8 (A38)
FAN MONITOR (A8)
801-0203-441
A40 DC FAN
A41 DC FAN
A42 DC FAN
A43 DC FAN
A44 DC FAN
USER/TEST REMOTE
RS-485 OUT
LTR | ZONE | DATE | DFTM | ENG | ECO NBR
C | . | 12/30/11 | DS | DG | 61098
CHANGE AC INLET SCHEME - POWERCON
D | . | 02/15/12 | CMS | CMS | P52109
Revised PA Module Schematic #
HARRIS
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DRAWN BY C STOTTS
DATE 8/17/11
ENG CHK C STOTTS
PROD ENG C STOTTS
MFG ENG W OLSON
SHEET 1 OF 1
TITLE
WIRING DIAGRAM
AC-DC INTERCONNECT
VAX-4PA
DWG NO 839-8464-304
REV D

DWG NO. 839-8464-077



REVISION LTR	ZONE	DATE	DFTM	ENG	ECO NBR
C	.	7/13/10	CDB	DC	P47687
CHANGED RF SPLITTER DESIGNATOR					
D	.	12/20/11	CS	CS	P51690
REVISED TITLE					

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BROADCAST COMMUNICATIONS
P.O. BOX 4290
QUINCY, ILLINOIS 62305

DRAWN BY D SPARAND
DATE 02/01/08
ENG CHK D SPARAND
PROD ENG D SPARAND
MFG ENG V OLSON
D SHEET 1 OF 1

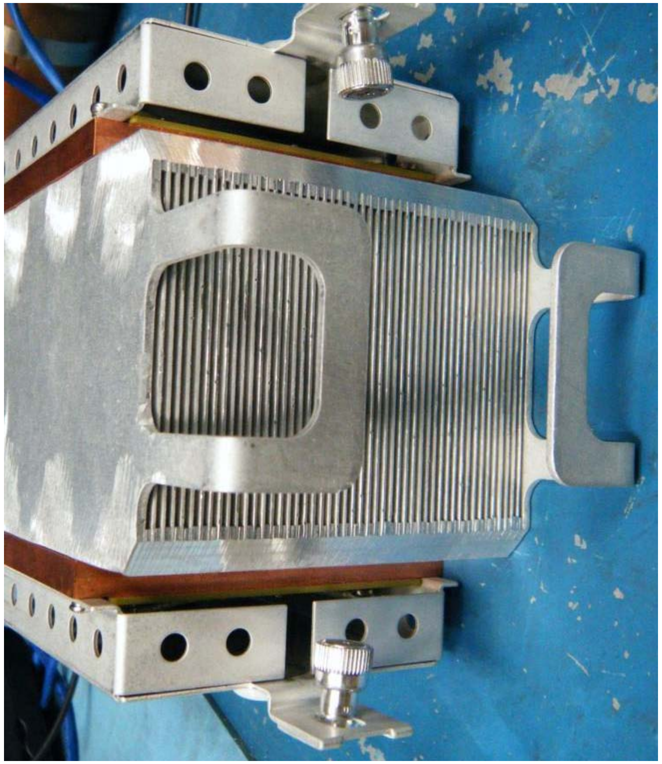
TITLE
WIRING DIAGRAM
RF INTERCONNECT
V 670-1000/VAX-4PA

DWG NO 839-8464-077 REV D

PLATINUM VAX PA MODULE



Rear



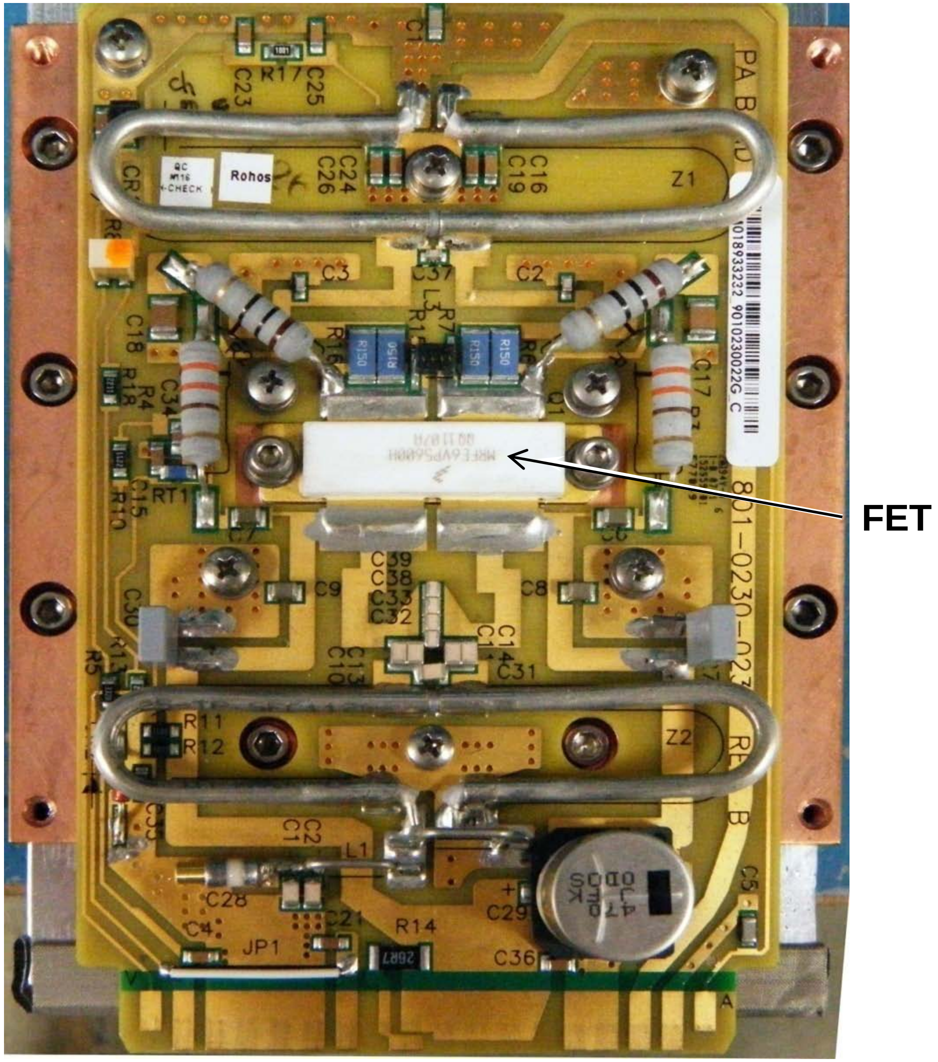
Front

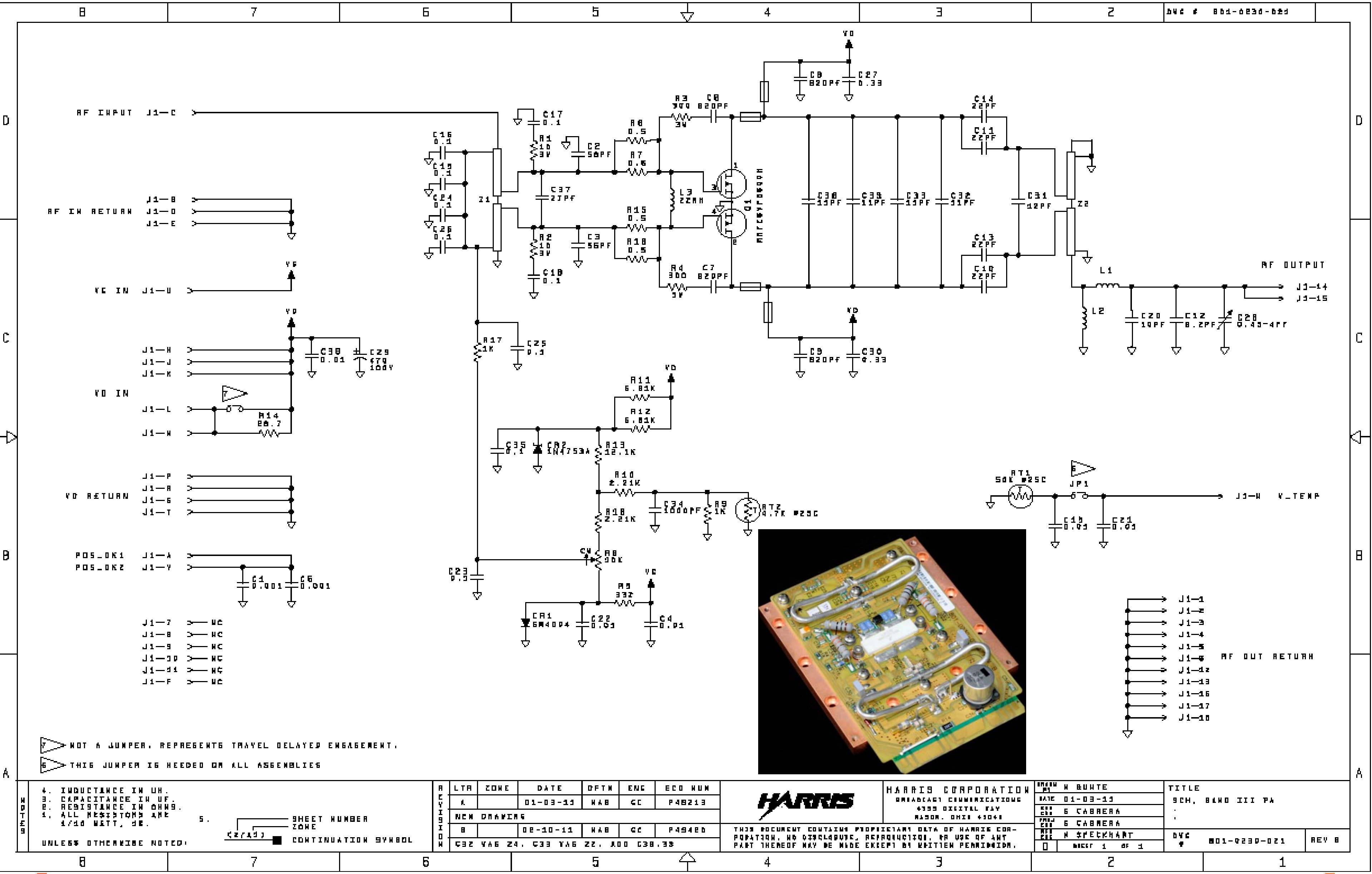
- PA modules ship in rack but locked down out of position.
- Must be loosened and pushed in prior to turn-on.
- PA modules removed and packed separately in standalone systems.

VAX PA MODULE AND PALLET

- Module gain 21-23 dB
- Two RF pallets per module
- One FET per pallet
- Idle (quiescent) current 1.5 amps per pallet
- Idle current 3.0 amps per module
- Pallet RF ouput: COFDM 100W avg.
DAB 150W avg.
ATSC 180W avg.
Analog 250W
- Broadband VHF – Band III
- Weight 4.5 kg (9.9 lbs)
- 16-18 amps per module typical
- Max module current 21-22 amps

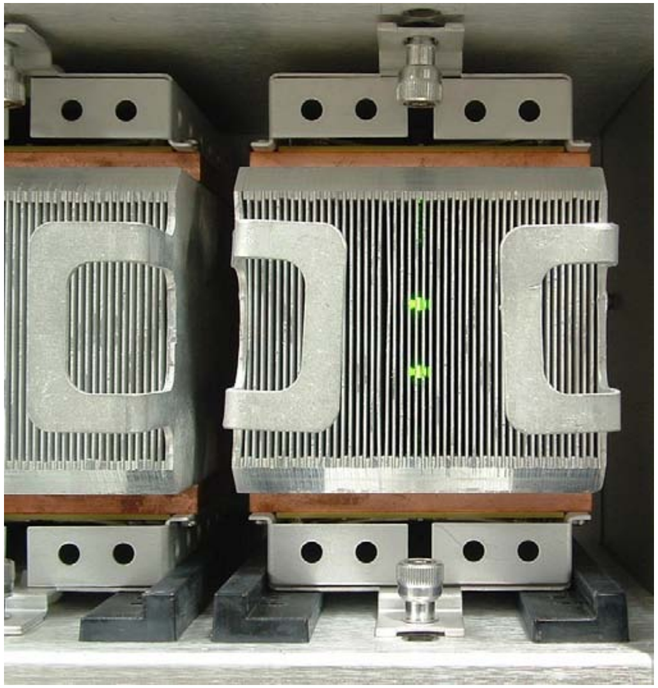
VAX PA Pallet (cover removed)



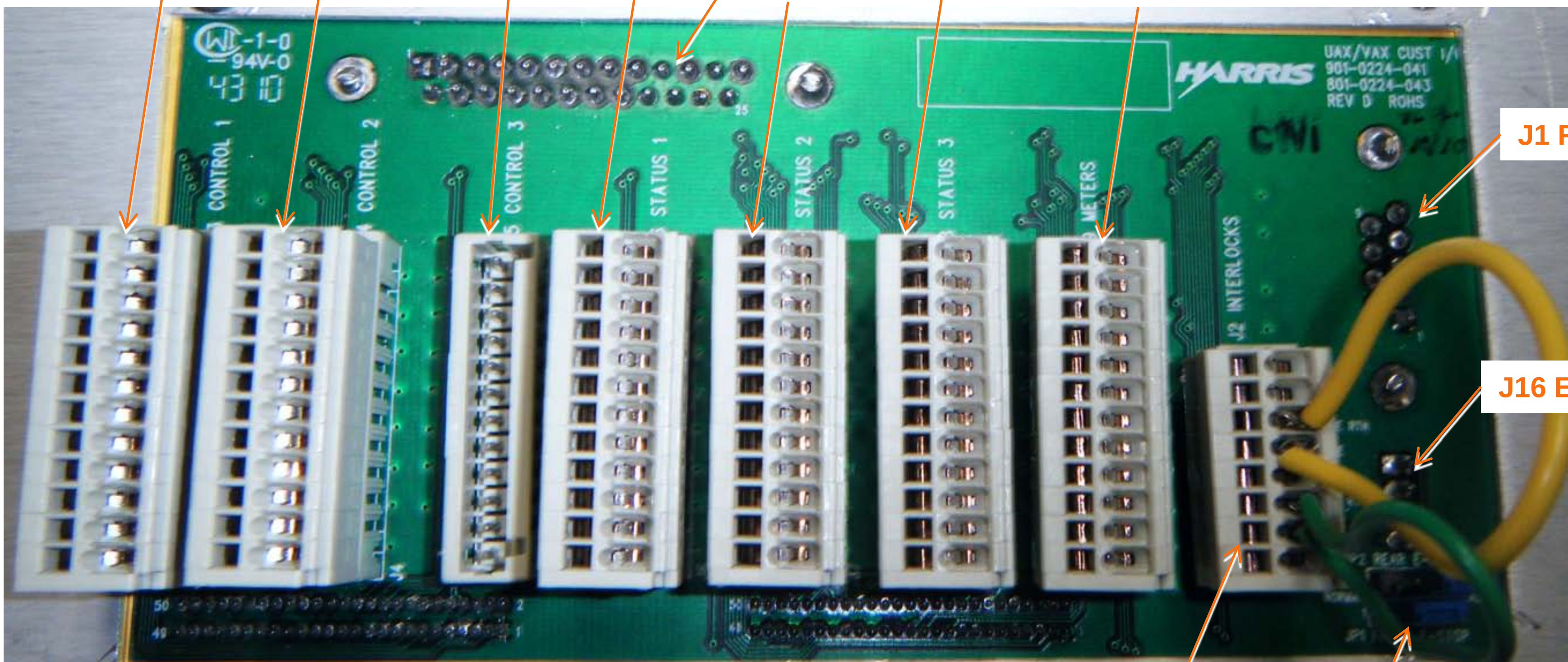

RF INPUT J1-C
RF IN RETURN J1-B J1-D J1-E
VG IN J1-U
VD IN J1-H J1-J J1-K J1-L J1-M
VD RETURN J1-P J1-R J1-S J1-T
POS_OK1 J1-A
POS_OK2 J1-Y
RF OUTPUT J1-14 J1-15
J1-W V_TEMP
RF OUT RETURN
NOT A JUMPER, REPRESENTS TRAVEL DELAYED ENGAGEMENT.
THIS JUMPER IS NEEDED ON ALL ASSEMBLIES
4. INDUCTANCE IN UH.
3. CAPACITANCE IN UF.
2. RESISTANCE IN OHMS.
1. ALL RESISTORS ARE 1/10 WATT, 5%.
UNLESS OTHERWISE NOTED:
SHEET NUMBER
ZONE
CONTINUATION SYMBOL
NEW DRAWING
HARRIS CORPORATION
SCH, BAND III PA
801-0230-021

VAX IPA MODULE

- IPA module same as PA module dB
- IPA only present in 8 PA module PAB
- One IPA pallet feeds 4 PA modules. The other pallet feeds the other 4 PA modules.
- Two LEDs for IPAs visible through heat sinks. Normally lit green. If not green… pallet is not operational.
- Idle (quiescent) current 2.0 amps per pallet for IPA. This was done to improve analog performance.

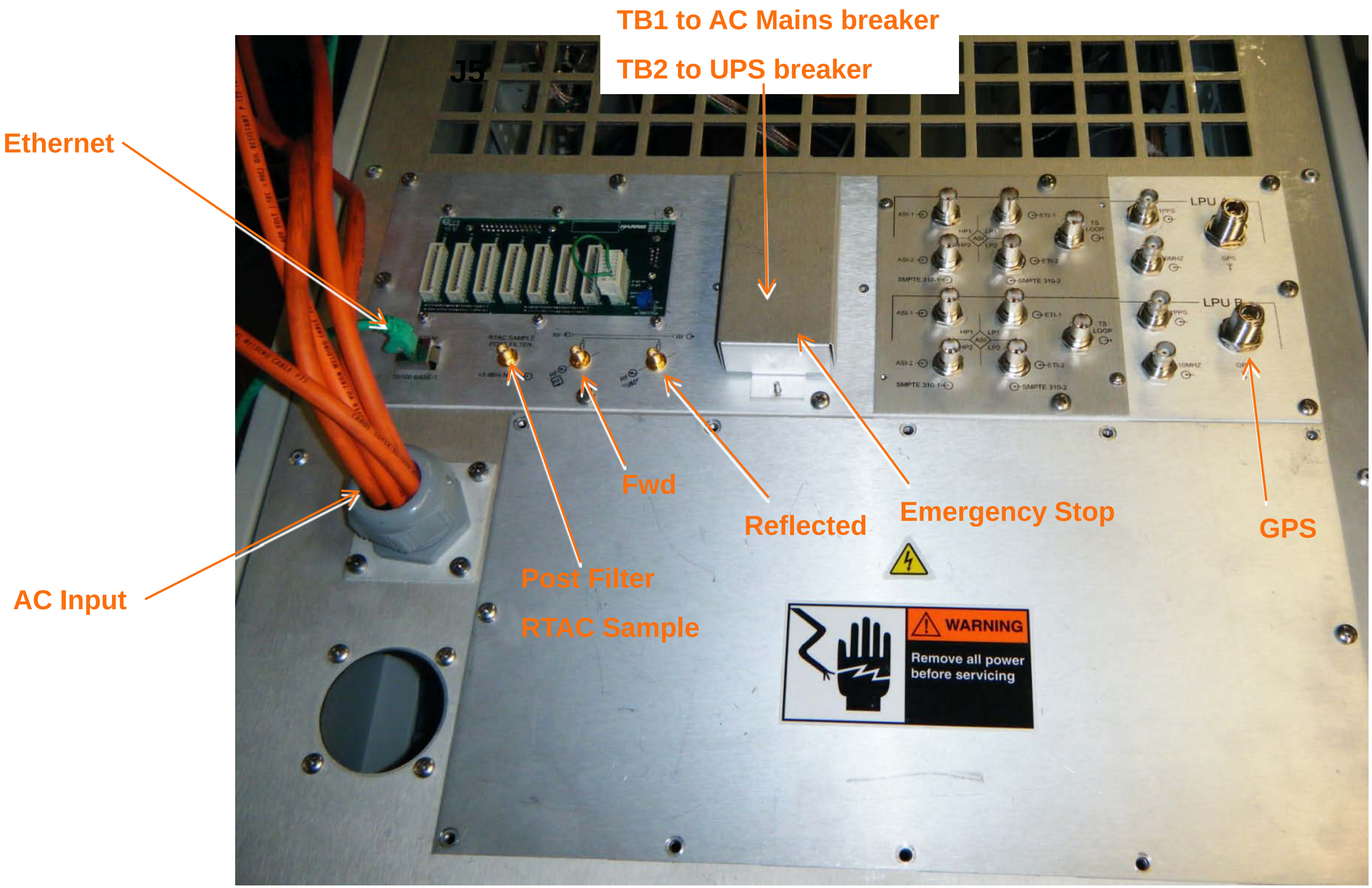


UAX/VAX CUSTOMER I/O BOARD

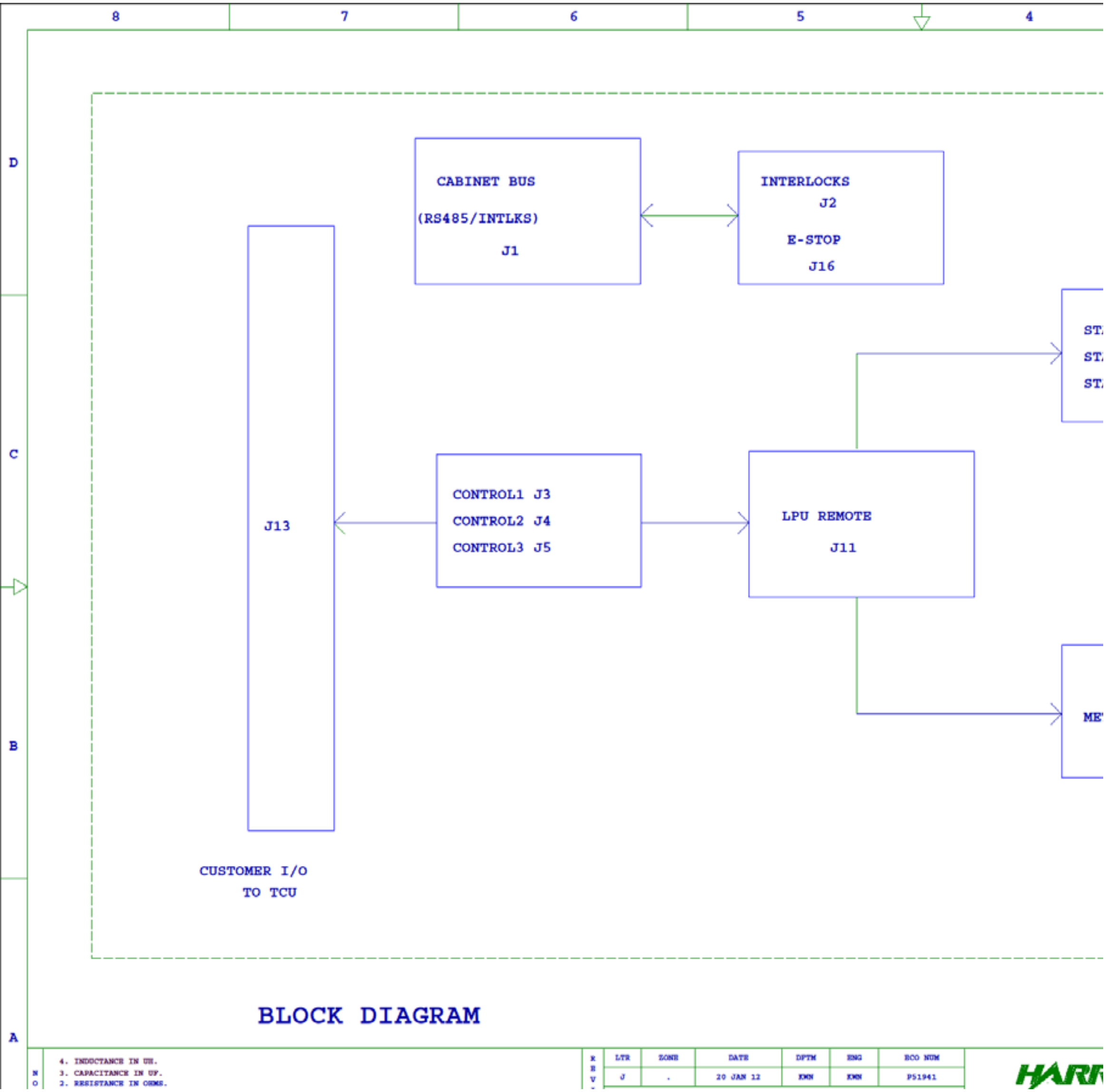


On top of deluxe cabinet.

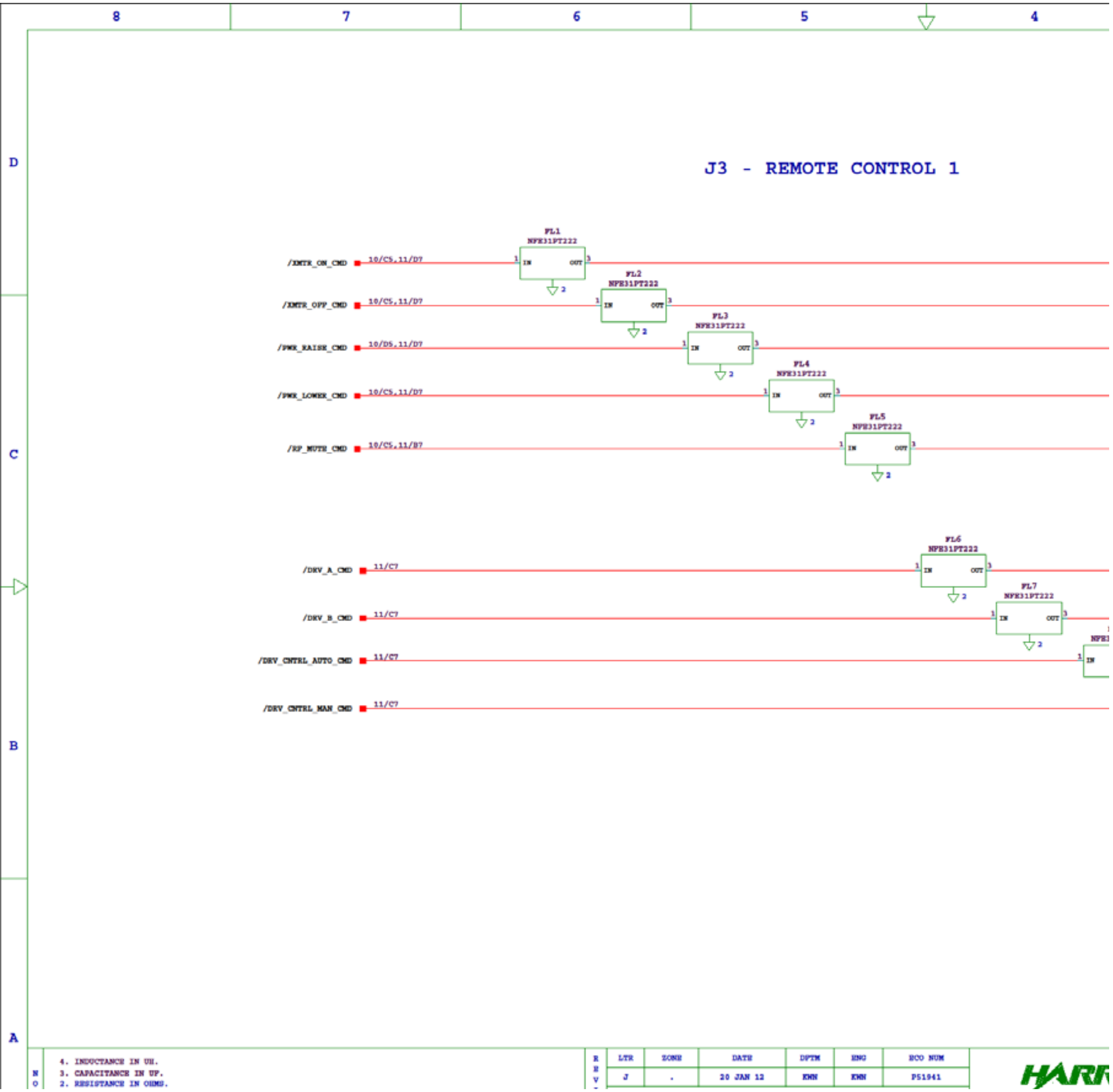
UAX/VAX CUSTOMER I/O PANEL

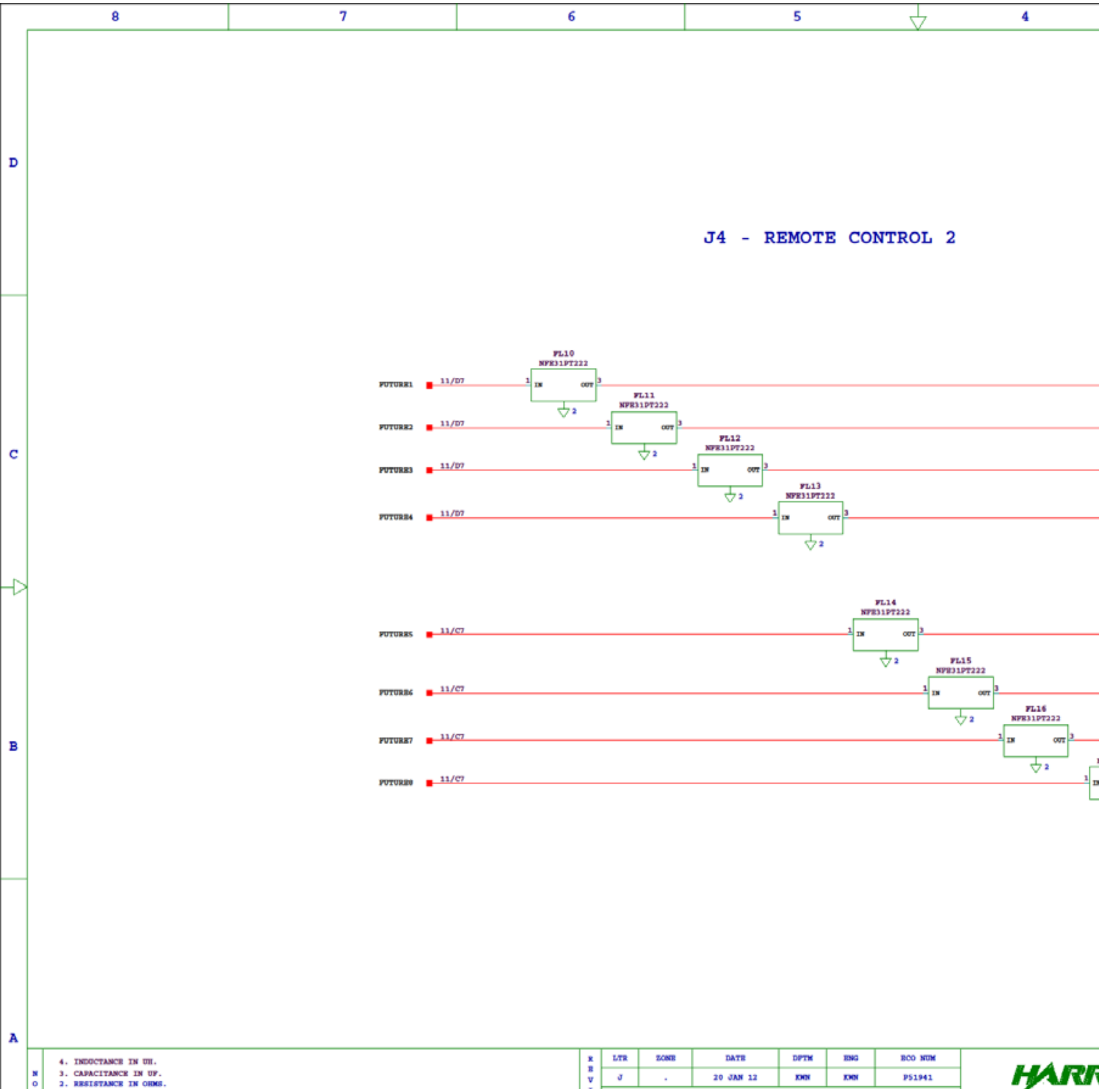


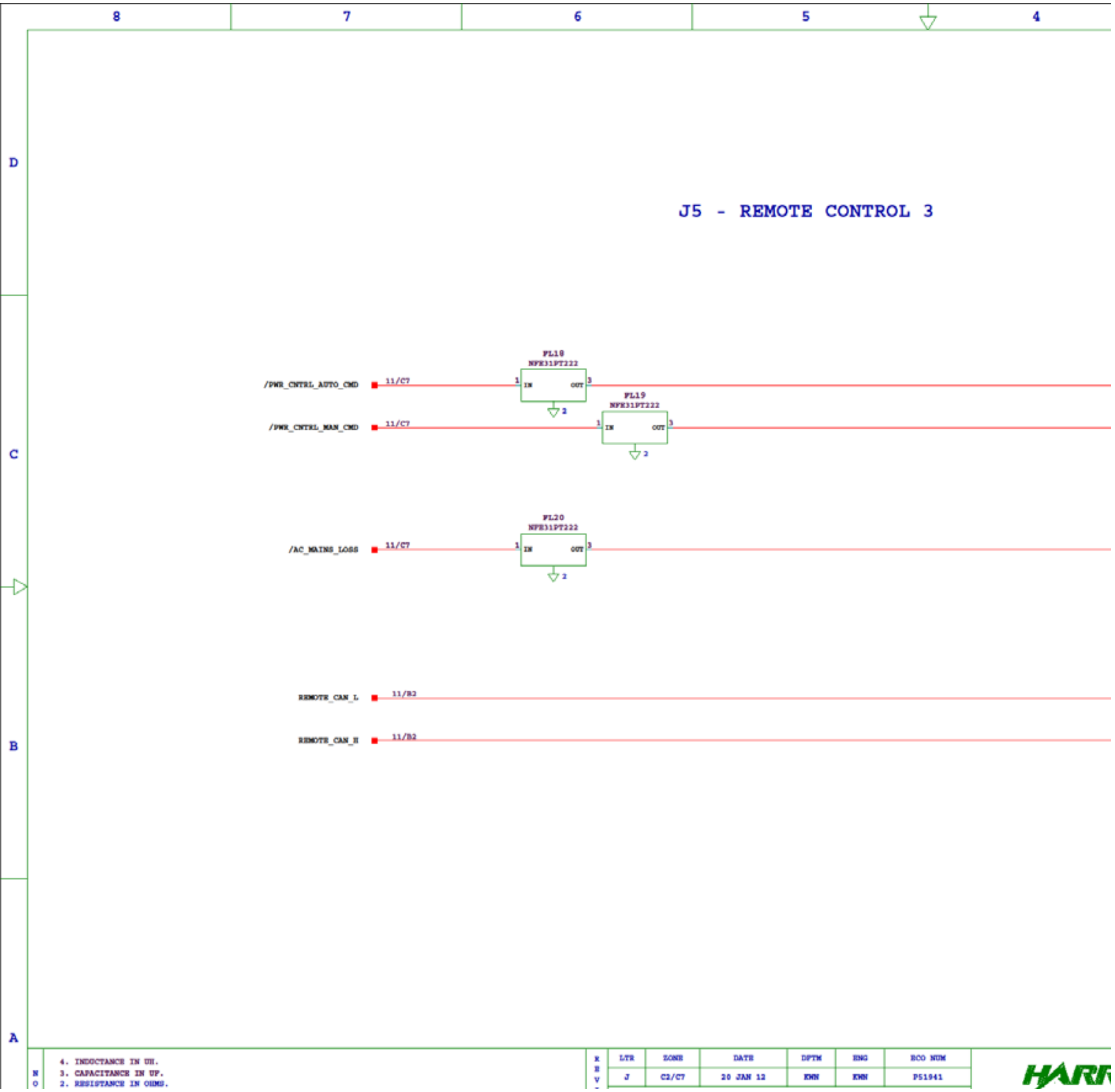
SCH, UAX/VAX CUST I/O 801-0224-041 SECTION 100



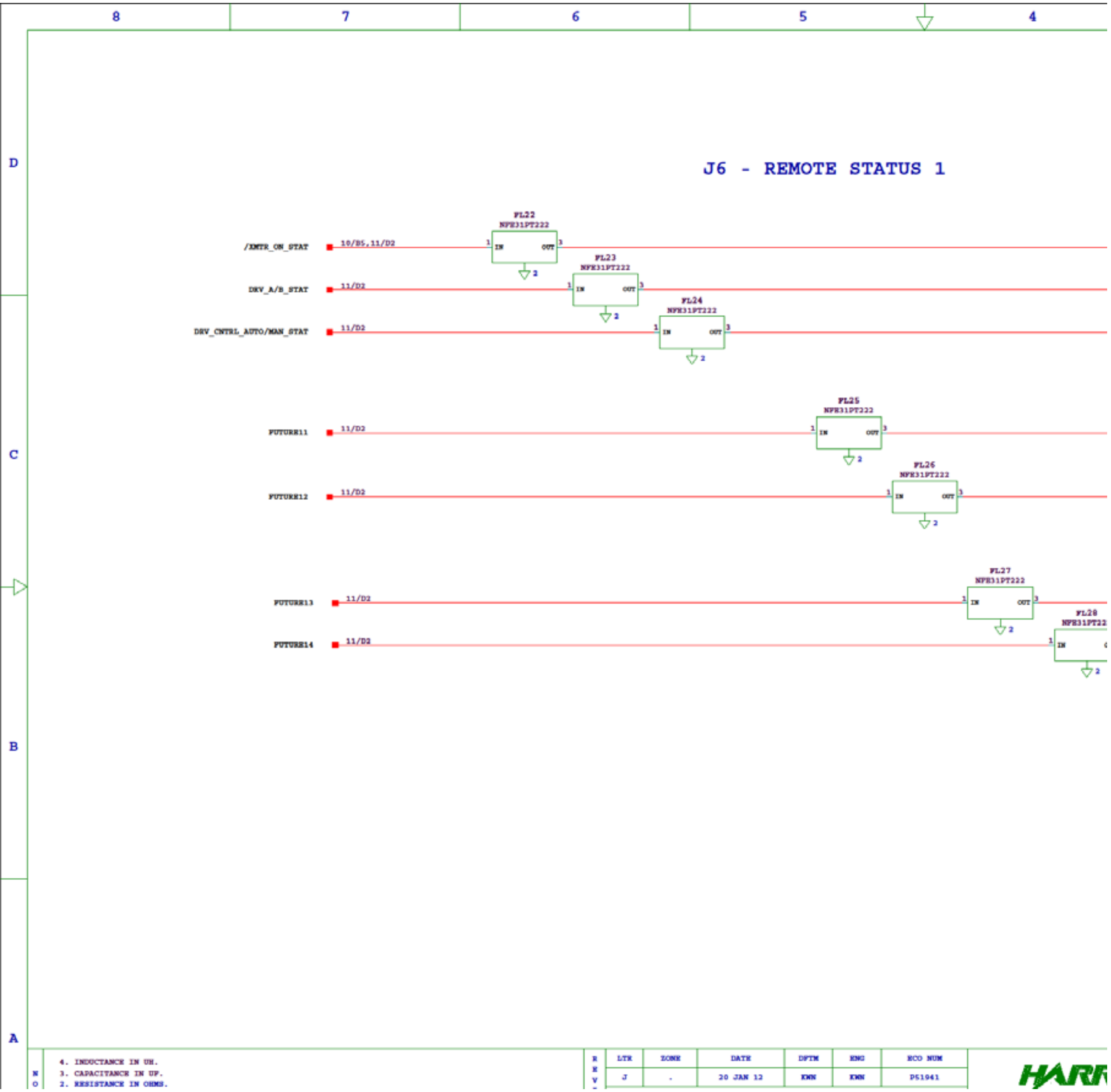
SCH, UAX/VAX CUST I/O 801-0224-041 SECTION 100

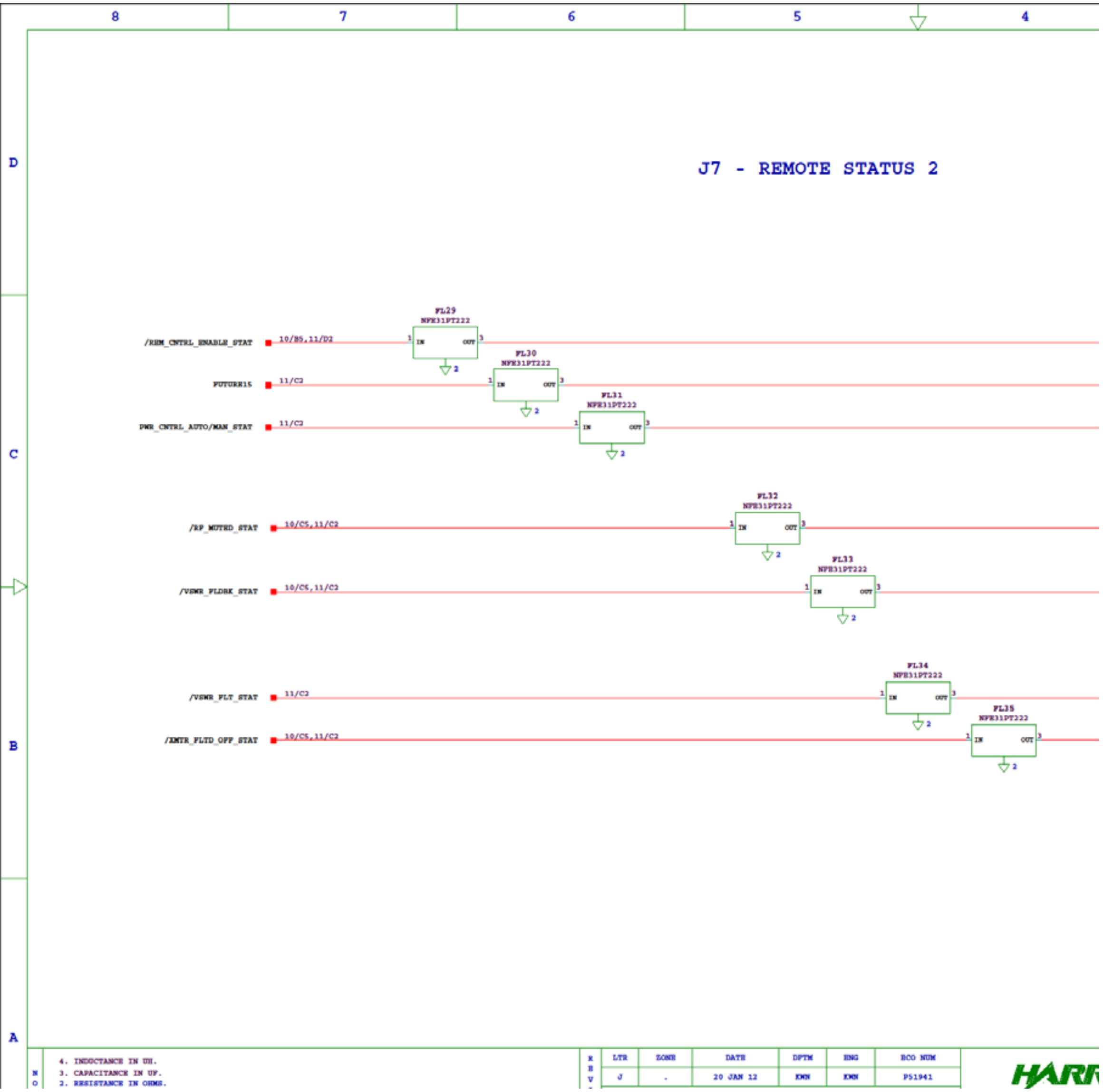


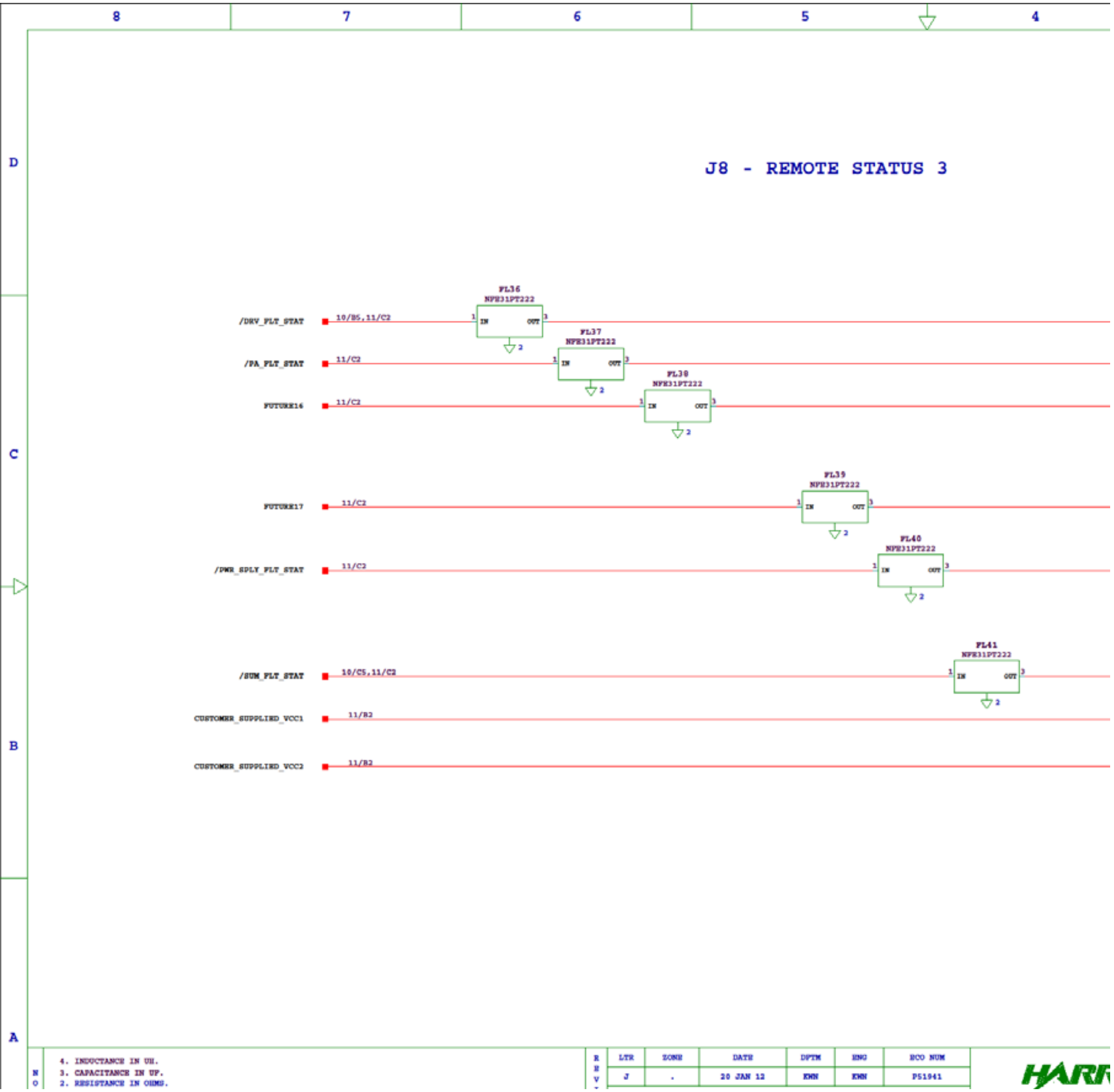

J4 - REMOTE CONTROL 2
FL10
FL11
FL12
FL13
FL14
FL15
FL16
NFE31PT222
FUTURE1
FUTURE2
FUTURE3
FUTURE4
FUTURE5
FUTURE6
FUTURE7
FUTURE8
11/D7
11/C7
4. INDUCTANCE IN UH.
3. CAPACITANCE IN UF.
2. RESISTANCE IN OHMS.
LTR
ZONE
DATE
DFTM
ENG
ECO NUM
J
20 JAN 12
KWN
P51941

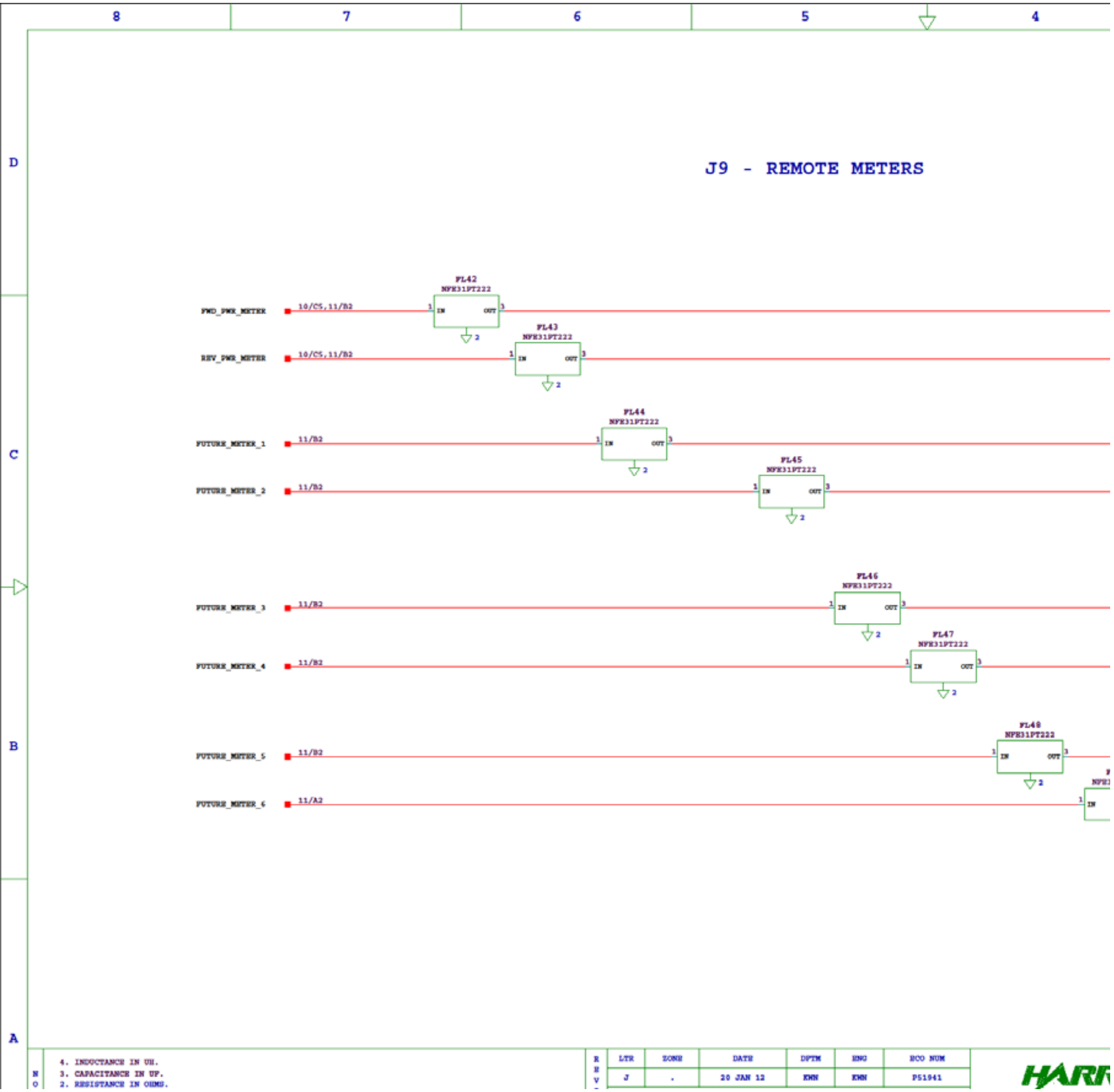

J5 - REMOTE CONTROL 3
FL18
NFE31PT222
FL19
NFE31PT222
FL20
NFE31PT222
/PWR_CNTRL_AUTO_CMD
/PWR_CNTRL_MAN_CMD
/AC_MAINS_LOSS
REMOTE_CAN_L
REMOTE_CAN_H
11/C7
11/B2
4. INDUCTANCE IN UH.
3. CAPACITANCE IN UF.
2. RESISTANCE IN OHMS.
LTR
ZONE
DATE
DFTM
ENG
ECO NUM
J
C2/C7
20 JAN 12
KWN
KWN
P51941

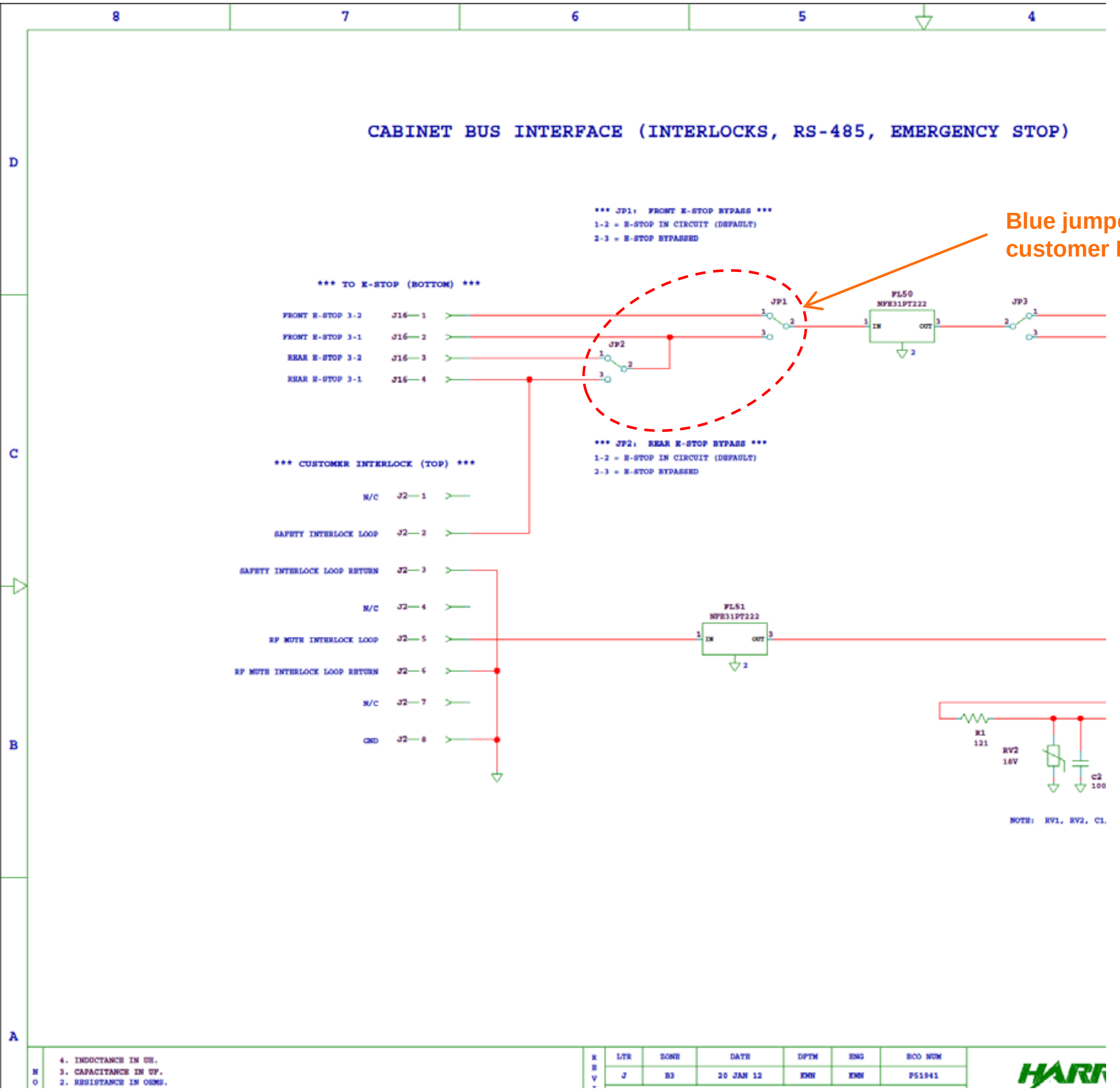
SCH, UAX/VAX CUST I/O 801-0224-041 SECTION 100



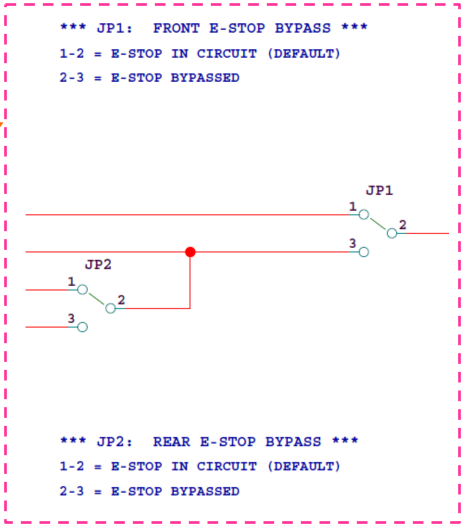

8
7
6
5
4
D
C
B
A
J7 - REMOTE STATUS 2
FL29
NFE31PT222
/REM_CNTRL_ENABLE_STAT
10/B5,11/D2
FL30
NFE31PT222
FUTURE15
11/C2
FL31
NFE31PT222
PWR_CNTRL_AUTO/MAN_STAT
11/C2
FL32
NFE31PT222
/RF_MUTED_STAT
10/C5,11/C2
FL33
NFE31PT222
/VSWR_FLDBK_STAT
10/C5,11/C2
FL34
NFE31PT222
/VSWR_FLT_STAT
11/C2
FL35
NFE31PT222
/XMTR_FLTD_OFF_STAT
10/C5,11/C2
IN
OUT
4. INDUCTANCE IN UH.
3. CAPACITANCE IN UF.
2. RESISTANCE IN OHMS.
LTR
ZONE
DATE
DFTM
ENG
ECO NUM
J
.
20 JAN 12
KMN
KMN
P51941

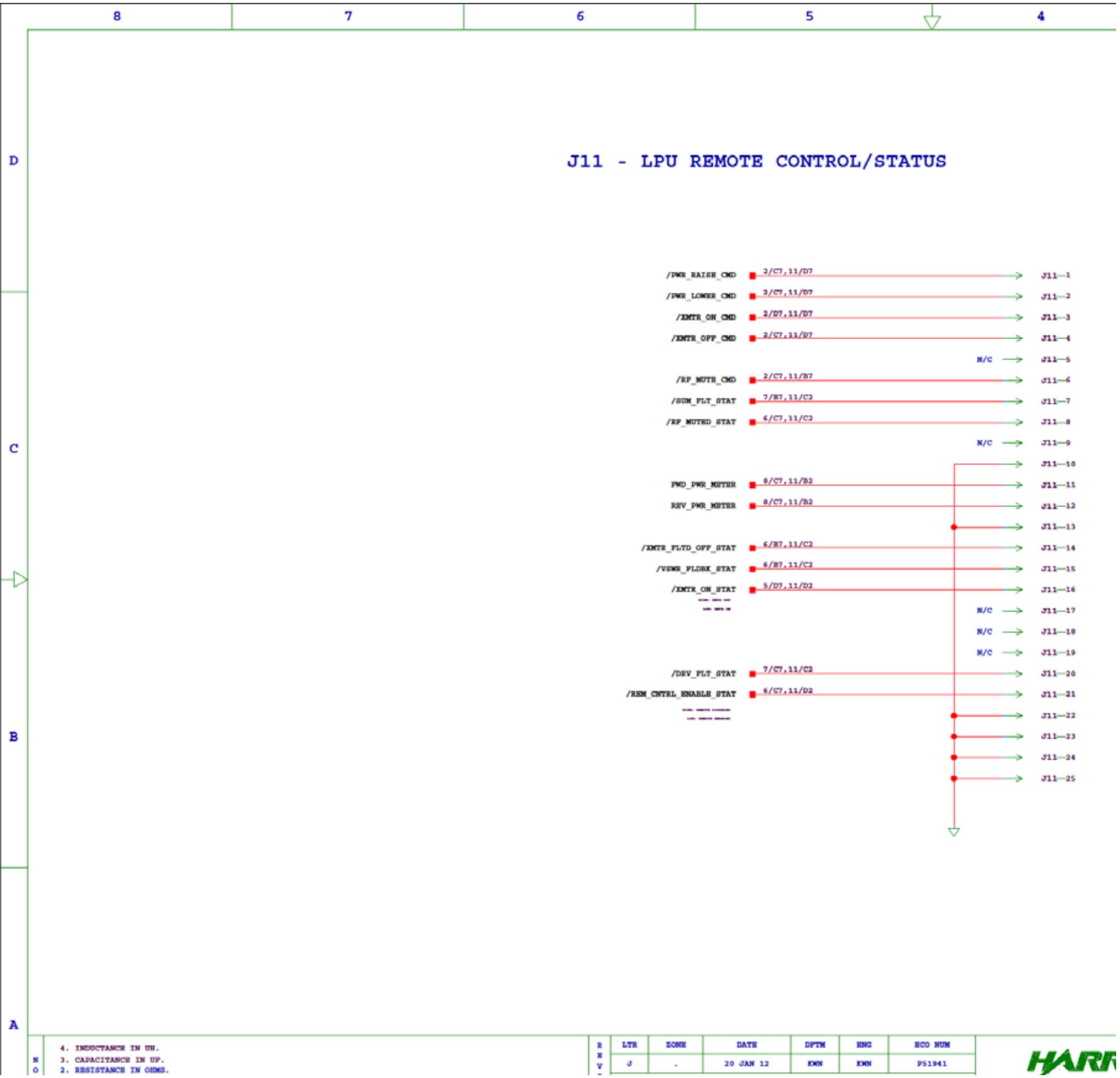

J8 - REMOTE STATUS 3
/DRV_FLT_STAT
/PA_FLT_STAT
FUTURE16
FUTURE17
/PWR_SPLY_FLT_STAT
/SUM_FLT_STAT
CUSTOMER_SUPPLIED_VCC1
CUSTOMER_SUPPLIED_VCC2
FL36
FL37
FL38
FL39
FL40
FL41
NFE31PT222
4. INDUCTANCE IN UH.
3. CAPACITANCE IN UF.
2. RESISTANCE IN OHMS.
LTR
ZONE
DATE
DFTM
ENG
ECO NUM
J
20 JAN 12
P51941


J9 - REMOTE METERS
FWD_PWR_METER
REV_PWR_METER
FUTURE_METER_1
FUTURE_METER_2
FUTURE_METER_3
FUTURE_METER_4
FUTURE_METER_5
FUTURE_METER_6
10/C5,11/B2
11/B2
11/A2
FL42
FL43
FL44
FL45
FL46
FL47
FL48
NFE31PT222
IN
OUT
4. INDUCTANCE IN UH.
3. CAPACITANCE IN UF.
2. RESISTANCE IN OHMS.
LTR
ZONE
DATE
DFTM
ENG
ECO NUM
J
20 JAN 12
KWN
P51941



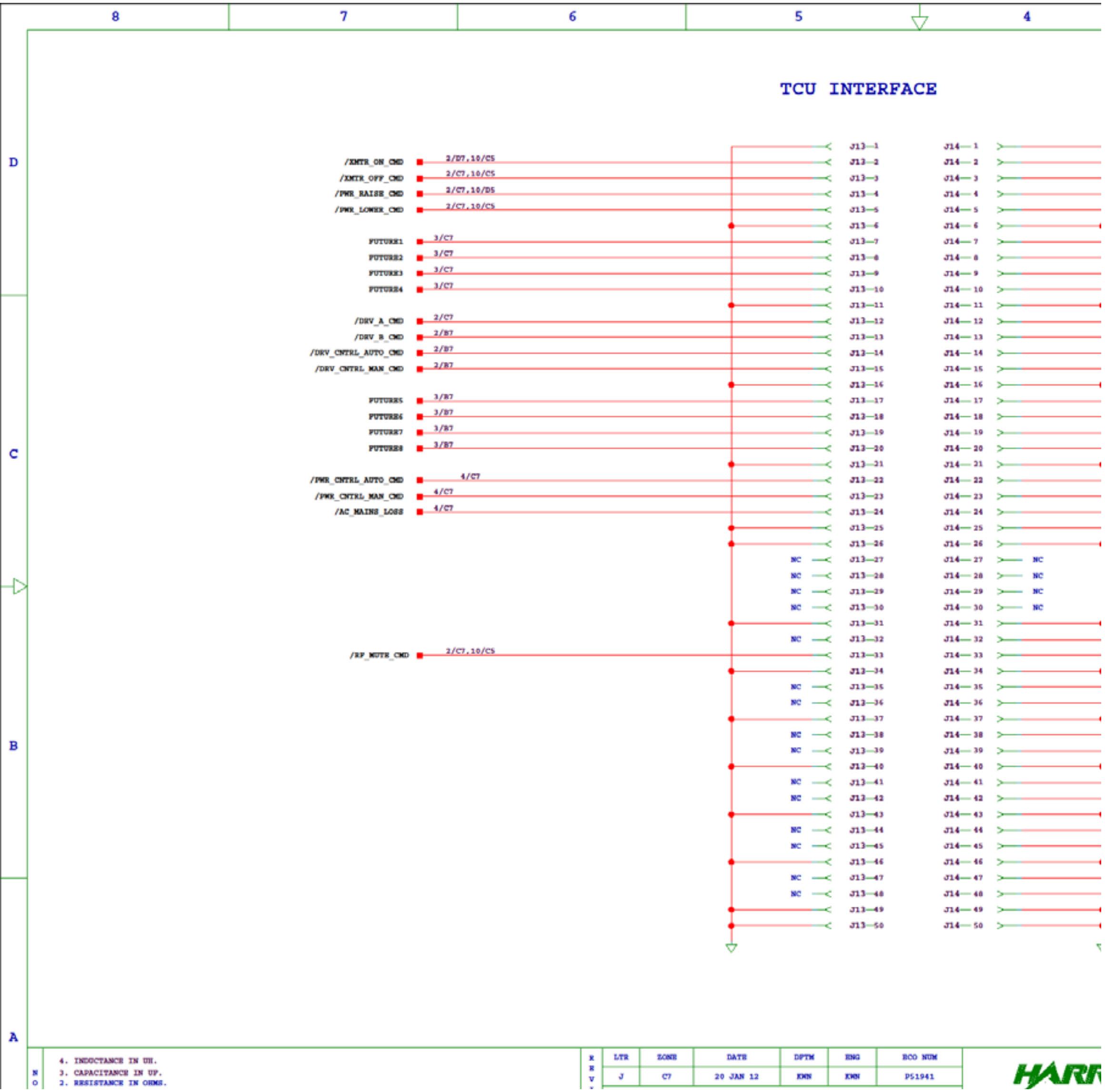
Blue jumpers on customer I/O board/





8
7
6
5
4
D
C
B
A
J11 - LPU REMOTE CONTROL/STATUS
/PWR_RAISE_CMD 2/C7,11/D7 J11—1
/PWR_LOWER_CMD 2/C7,11/D7 J11—2
/XMTR_ON_CMD 2/D7,11/D7 J11—3
/XMTR_OFF_CMD 2/C7,11/D7 J11—4
N/C J11—5
/RF_MUTE_CMD 2/C7,11/B7 J11—6
/SUM_FLT_STAT 7/B7,11/C2 J11—7
/RF_MUTED_STAT 6/C7,11/C2 J11—8
N/C J11—9
J11—10
FWD_PWR_METER 8/C7,11/B2 J11—11
REV_PWR_METER 8/C7,11/B2 J11—12
J11—13
/XMTR_FLTD_OFF_STAT 6/B7,11/C2 J11—14
/VSWR_FLDBK_STAT 6/B7,11/C2 J11—15
/XMTR_ON_STAT 5/D7,11/D2 J11—16
N/C J11—17
N/C J11—18
N/C J11—19
/DRV_FLT_STAT 7/C7,11/C2 J11—20
/REM_CNTRL_ENABLE_STAT 6/C7,11/D2 J11—21
J11—22
J11—23
J11—24
J11—25
4. INDUCTANCE IN UH.
3. CAPACITANCE IN UF.
2. RESISTANCE IN OHMS.
LTR
ZONE
DATE
DFTM
ENG
ECO NUM
J
-
20 JAN 12
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KWN
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HARR

SCH, UAX/VAX CUST I/O 801-0224-041 SECTION 100



LPU TX INTERFACE CONNECTOR

LPU TX Interface Connector - 25 Pin Male				
	Signal	Direction	Description	Control I/O Assignment
1	/Power Raise	Input	Power Raise Command	I/O Bus 0
2	/Power Lower	Input	Power Lower Command	I/O Bus 1
3	/TX On	Input	Transmitter On Command	I/O Bus 2
4	/TX Off	Input	Transmitter Off Command	I/O Bus 3
5	Remote Control Command	Input	Remote Control Command**	I/O Bus 4
6	/RF Mute Command	Input	RF mute command	Input directly to Signal Processing board
7	/Sum Fault	Output	Summary Fault Status	I/O Bus 5
8	/RF Mute Status	Output	RF Mute Status	I/O Bus 6
9	/UPS Shutdown	Input	Disables battery backup functionality	Input directly to Signal Processing board
10	/EQ Reset	Input	Resets adaptive correction tables to default	I/O Bus 16
11	/EQ Hold	Input	Holds current adaptive correction tables	I/O Bus 7
12	Not Used	Input		Analog Input 0
13	Not Used	Input		Analog Input 1
14	/Exciter Active	Input	Indicates that the exciter is active (Master/Slave Mode for UAX)**	I/O Bus 8
15	/RF Present	Output	Indicates that exciter RF output is valid	I/O Bus 9
16	On/Off Status	Output	Transmitter On/Off Status	I/O Bus 10
17	/Remote Fault Reset	Input	Restrike Command	I/O Bus 11
18	Auto/Manual Command	Input	Auto/Manual Mode Command**	I/O Bus 12
19	/TCU Present	Input	TCU Present Command	I/O Bus 13
20	Exciter/LPU Sum Flt	Output	Exciter/LPU Summary Fault Status	I/O Bus 14
21	Remote Enable\Disable	Output	Remote Control Status	I/O Bus 15
22	GND		Ground	
23	GND		Ground	
24	GND		Ground	
25	GND		Ground	

This connector is on the rear of the LPU. It can be used for remote control and monitoring on standalone transmitters (non racked systems without TCU's).

LPU USER REMOTE CONNECTOR

User Remote - 25 Pin Female				
	Signal	Direction	Description	Control I/O Assignment
1	Forward Power	Output	0 – 4.096VDC output representing Forward power level	Analog Output 0
2	Reflected Power	Output	0 – 4.096VDC output representing reflected power level	Analog Output 1
3	Spare Analog In 1	Input		Analog Input 2
4	Spare Analog In 2	Input		Analog Input 3
5	+12Vdc	Output	+12Vdc, 200mA max	
6	GND		Ground	
7	GND		Ground	
8	GND		Ground	
9	GND		Ground	
10	GND		Ground	
11	Alarm 0 Common		Alarm 0 Relay Common	
12	Alarm 0 Normally Closed		Alarm 0 Relay Normally Closed (Faulted) Position	
13	Alarm 0 Normally Open		Alarm 0 Relay Normally Open (Non-Faulted) Position	
14	Alarm 1 Common		Alarm 1 Relay Common	
15	Alarm 1 Normally Closed		Alarm 1 Relay Normally Closed (Faulted) Position	
16	Alarm 1 Normally Open		Alarm 1 Relay Normally Open (Non-Faulted) Position	
17	Alarm 2 Common		Alarm 2 Relay Common	
18	Alarm 2 Normally Closed		Alarm 2 Relay Normally Closed (Faulted) Position	
19	Alarm 2 Normally Open		Alarm 2 Relay Normally Open (Non-Faulted) Position	
20	Alarm 3 Common		Alarm 3 Relay Common	
21	Alarm 3 Normally Closed		Alarm 3 Relay Normally Closed (Faulted) Position	
22	Alarm 3 Normally Open		Alarm 3 Relay Normally Open (Non-Faulted) Position	
23	Alarm 4 Common		Alarm 4 Relay Common	
24	Alarm 4 Normally Closed		Alarm 4 Relay Normally Closed (Faulted) Position	
25	Alarm 4 Normally Open		Alarm 4 Relay Normally Open (Non-Faulted) Position	

This connector is on the rear of the LPU. It can be used for remote control and monitoring on standalone transmitters (non racked systems without TCU's).

Additional notes:

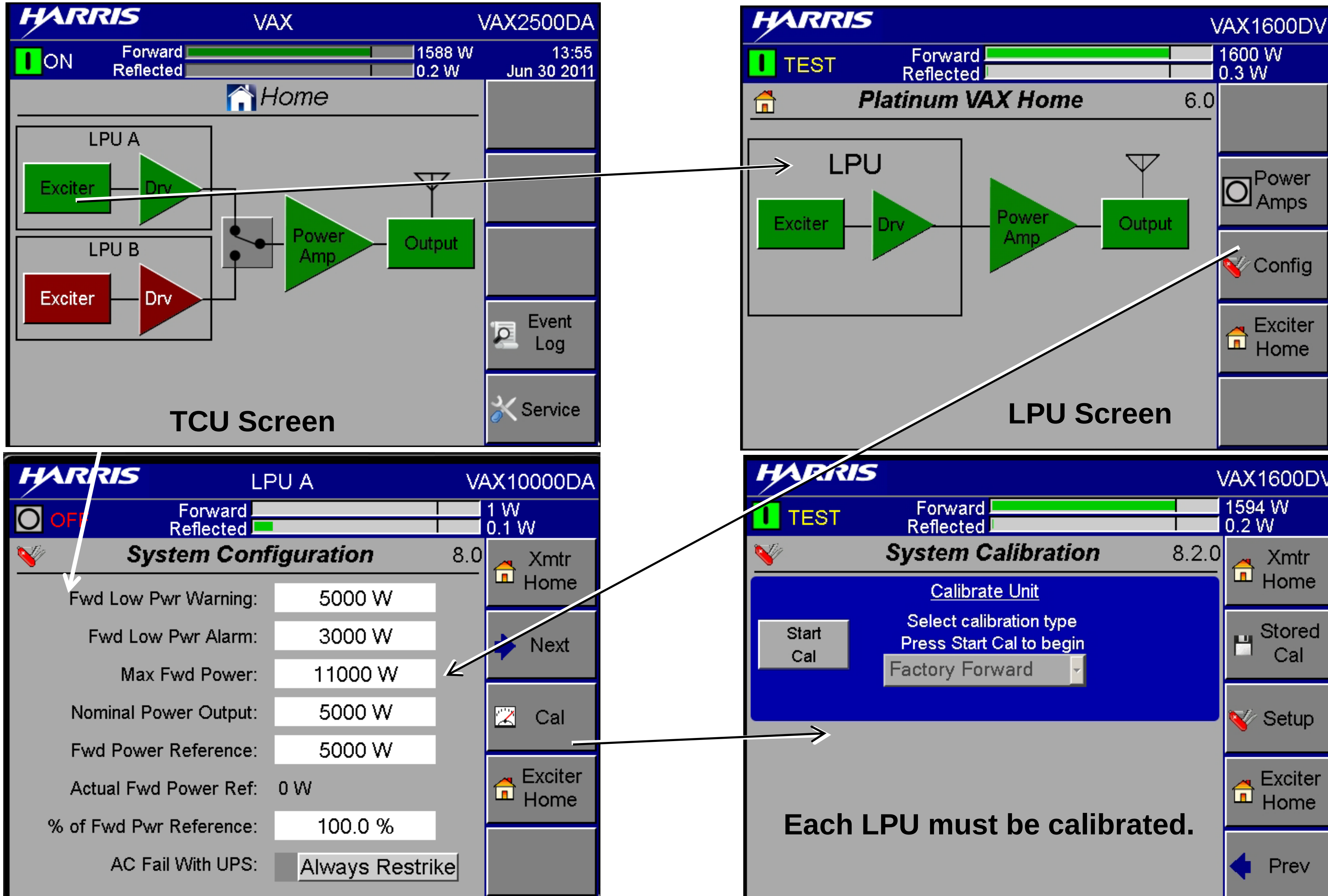
The Remote Control, /Exciter Active, and Auto/Manual commands (from Tx Interface) don’t work in standalone operation.

The VAX transmitter will default to standalone mode when no connections are made to the TX Interface. If the /TCU present signal is asserted at anytime, the transmitter will be forced into dual mode for operations with a TCU. The transmitter will remain in dual mode until power cycled with the /TCU Present signal de-asserted.

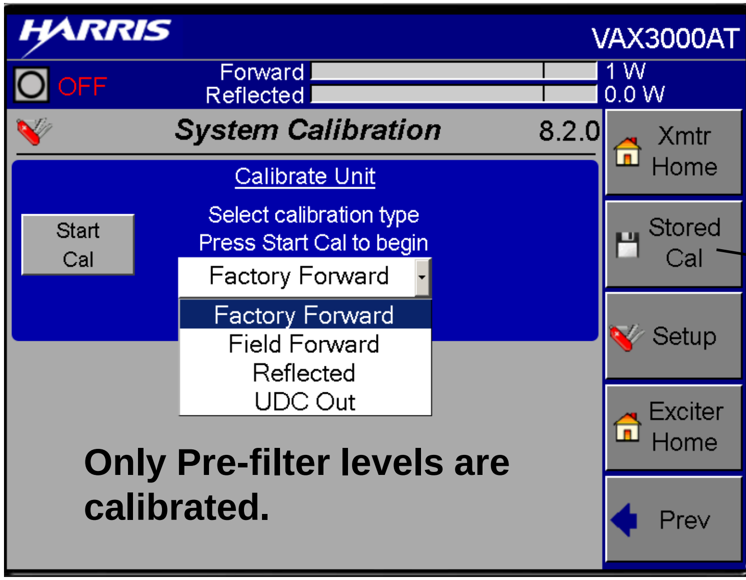
When in dual mode, the Tx Interface will be operational regardless of Remote Control Enabled/Disabled. TCU always in control.

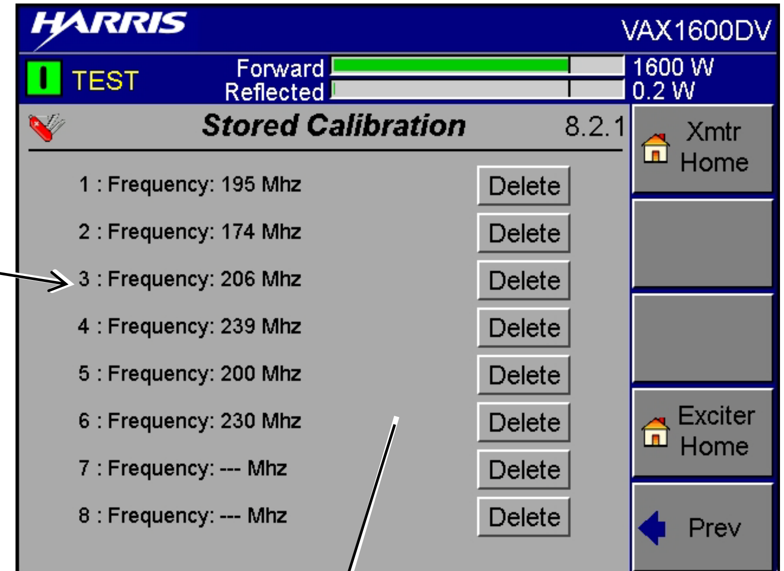
When in standalone mode, the TX Interface will be disabled when remote control is disabled.

CALIBRATION PERFORMED ON LPUS



CALIBRATION





Factory forward and reflected cals are typically not required in the field. These are two point cals @ 10% & 100% levels. Reflected cals use 20 dB pad for low level.

If done in the field LPU & PAB # forward and reflected require use of quantified couplers, connectors and cables of adequate power rating (>3000W for PAB).

LPU & PAB cals not required in field. Displays only.

Couplers tilt up with frequency. They are compensated.

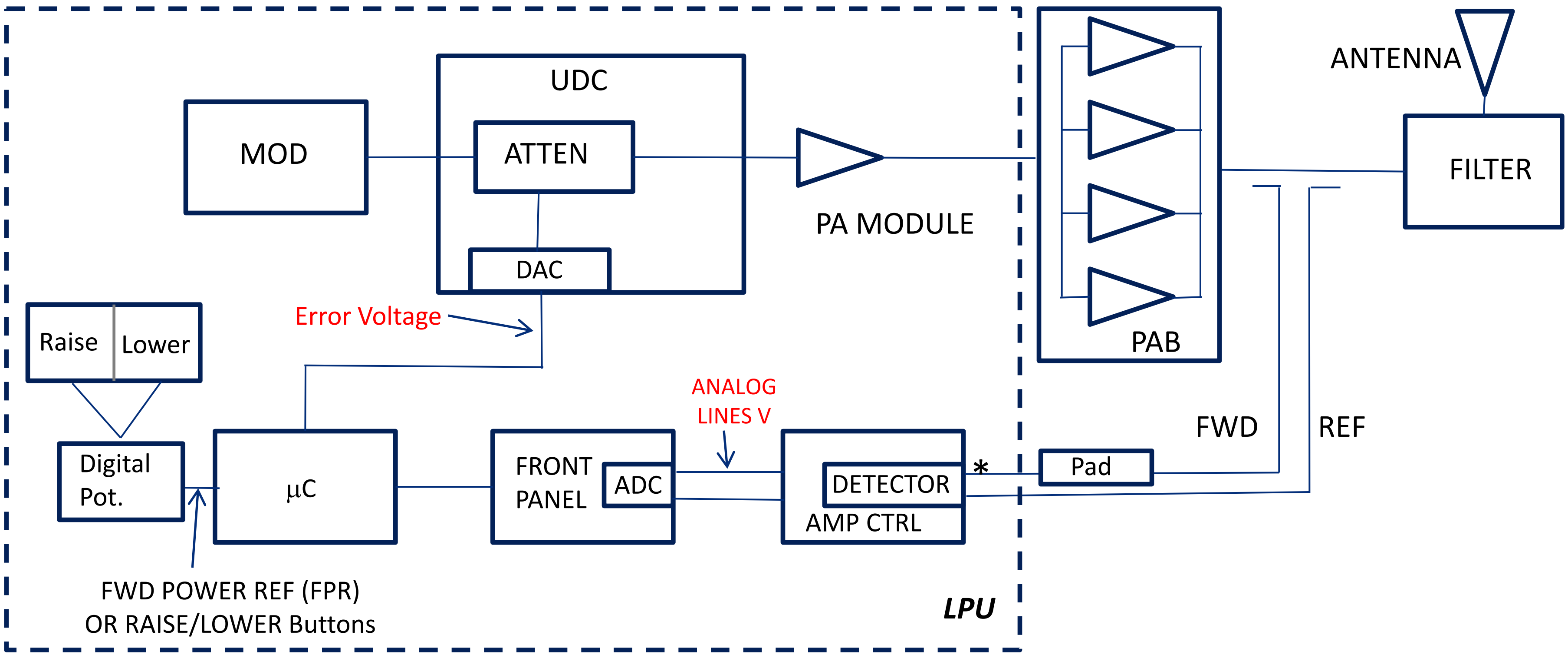
Multiple factory calibrations are used in N+1 applications. These are two point cals.

Field cal is adequate for calibration. It is a 1 point calibration.

Field cals are not stored.

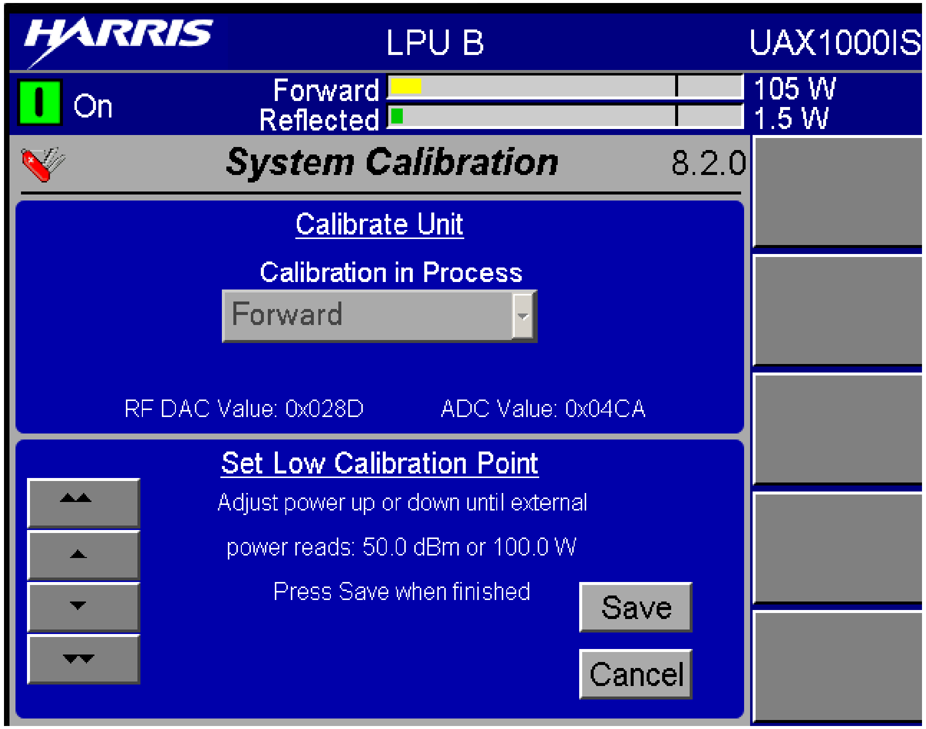
8 cals can be stored. If more than 8 cals are performed the old cals are deleted as new cals are performed.

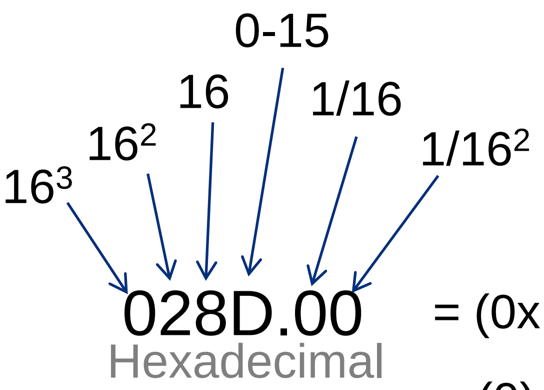
VAX ALC Control



- * 0 dBm at this point during power cal when at model number power. Use pads as needed.
- mC (micro) compares FPR to current power level then raises or lowers UDC attenuator
- Power increases during ramp start are done in 50% increments (1 per sec.) until current power is within a few watts of Forward Power Reference value then stops.
- RF ATTEN DAC value found on calibration screen. Values > 500 (HEX) indicate a problem.
- Power increase should be evident at DAC level >200 (HEX).
- DAC level is controlled directly in MANUAL mode of operation.

Hexadecimal used to represent binary coded vaules.





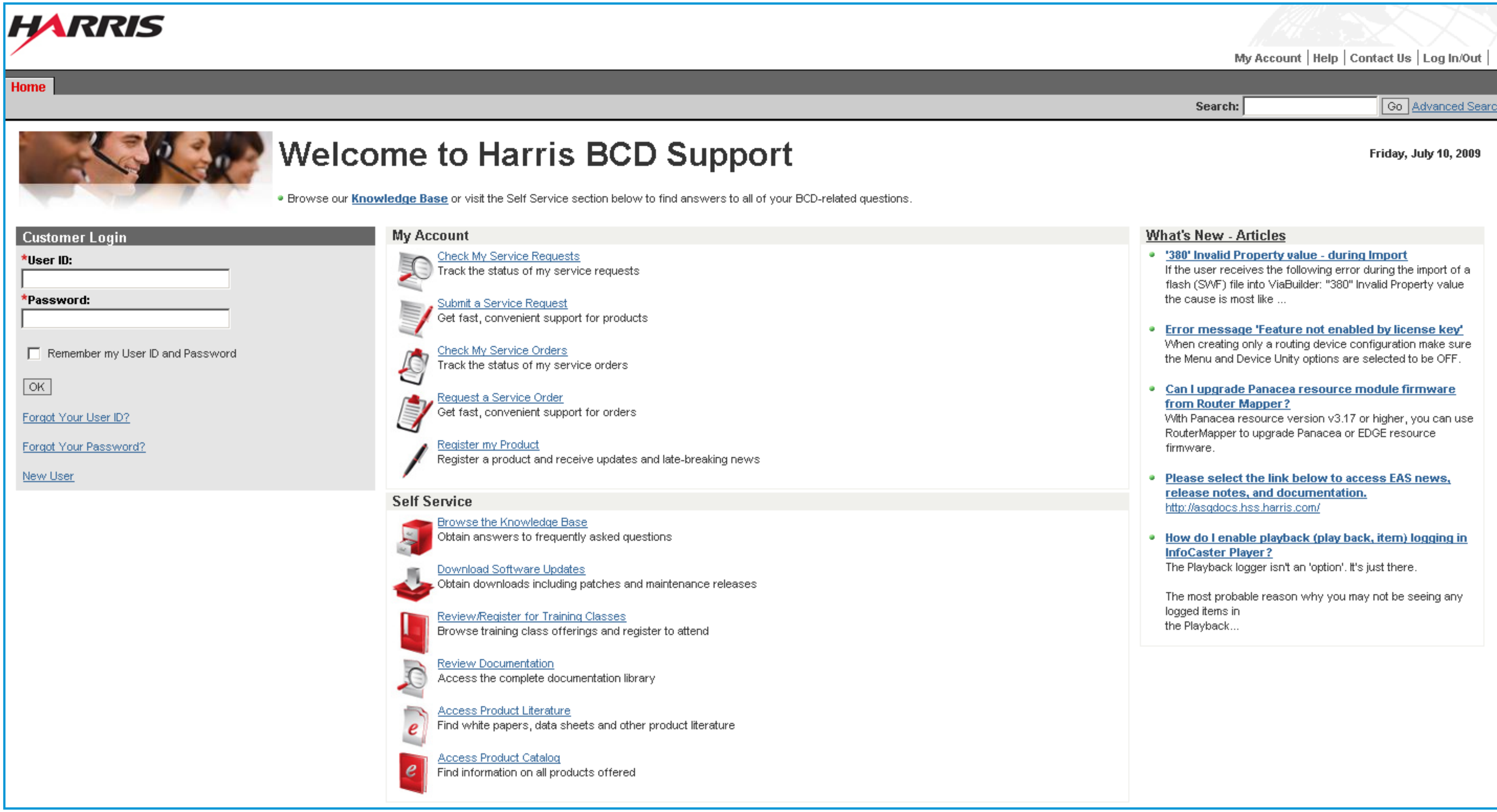
$= (0x16^3)+(2x16^2)+(8x16)+ (13)$

$= (0) \quad +(512) \quad +(128) \quad + (13) \quad = \quad 653$ Decimal

Decimal:	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Hexadecimal:	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F

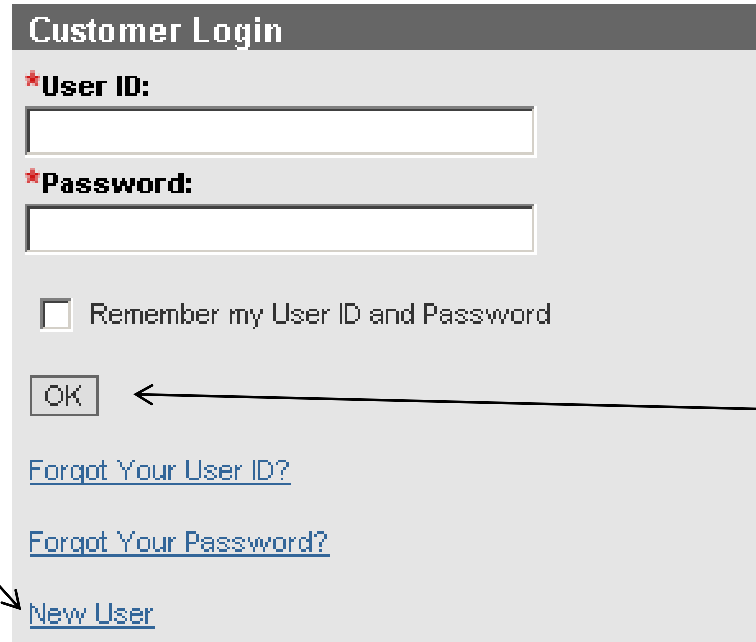
BCD SUPPORT (service web portal)

- **Got to** http://support.broadcast.harris.com/



BCD SUPPORT = LOGIN SCREEN

Apply for User ID and Password



MUST use OK button to submit User ID & Password

- If you are a new user select “New User” and then specify a user ID and a password.
- Log in using your new User ID and Password.
- Note: You must use the OK button to submit your Log In/Password. Using the enter key will not work.

WEB SERVICE PORTAL – ACCESS SUMMARY

- Go to this link and create an account (or login if you already have an account)
http://support.broadcast.harris.com
- Logon to the site and click on "Review Documentation"
- Select "Television Transmission"
- Select "UHF Digital"
- Select "Maxiva-UAX"
- Click "Maxiva UAX Series Tech-Manual"
- File Download page will display, select "Open" or "Save"